



Living Rapid Review Update 12: What is the specific role of daycares and schools in COVID-19 transmission?



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The authors declare they have no conflicts of interest to report.

Executive Summary

Background

As jurisdictions continue to implement and lift restrictions to slow the spread of coronavirus disease 2019 (COVID-19), they face major decisions about how and when to re-open and operate schools and daycares. While children are known to be effective vectors for other viruses, such as influenza, their role in the transmission of COVID-19 is much less clear.

This living rapid review was produced to support public health decision makers' response to the COVID-19 pandemic. This review seeks to identify, appraise and summarize emerging research evidence to support evidence-informed decision making.

This review is based on the most recent research evidence available at the time of release. A previous version was completed on December 18, 2020. This updated version includes evidence available up to January 11, 2021.

In this living rapid review, we answer the question: **What is the specific role of daycares and schools in COVID-19 transmission?**

What Has Changed in This Version?

- The focus of the review has been refined and this version no longer includes findings related to transmission of COVID-19 by children outside of school or daycare settings. This has resulted in 35 studies being removed from this review that were not directly related to schools and daycares. This information has been archived and can be accessed at this [link](#).
- Data identified in our jurisdictional scan of regional infection prevention and control (IPAC) measures has been added to the main results tables with the relevant studies. Summary tables that were included in previous versions have been removed, but this information has been archived and can be accessed at this [link](#).
- Given the availability of stronger evidence, case reports and case series have been separated from the main results table and are available in Table 2.
- Two new syntheses and one update to a previous synthesis (no change in findings) are included
 - One scoping review summarized IPAC measures implemented internationally but did not report on the effectiveness of these interventions
 - One systematic review primarily included mathematical modelling studies and found no conclusive evidence that school closures impact R values.
- Two new studies (from England and Austria) estimate the impact of community transmission on likelihood of school and daycare cases and outbreaks; in England, for every increase of 5 cases/100 000 the relative risk (RR) of an outbreak is 1.73 (95% CI=1.28, 2.30). In Austria, when community rates doubled, the RR of a primary school-identified case is 1.66 (95% CI=1.38, 1.99).
- Nine new studies used random sampling of schools and students to identify asymptomatic undetected cases in schools (two in daycare and kindergarten only, two in primary schools only and five in primary and secondary schools); overall very few new cases were identified.

- Five new studies explored prevalence of infection or seroprevalence in school in response to a school-identified case (three included child care, primary and secondary schools, two included primary and secondary only); consistent with previous findings, the number of new cases identified were low however response rates were variable.
- New or updated surveillance data are available from eight jurisdictions around the world; consistent with previous findings while a number of cases are identified in school and child care settings, the number of reported outbreaks in these settings is low. These data are limited in that they do not identify the source of infection or transmission in situations where there is more than one case.
- Seven new studies report differences in community-level COVID-19 cases and hospitalizations before and after school reopening or comparing those who did and did not attend in person-schooling in the same time period.
 - One study (Florida) found higher rates in counties that resumed in person learning, however differences in other policies were also noted and not controlled for.
 - One study (USA) noted no difference in hospitalization rates in areas with and without in-person schooling; however findings were not conclusive in areas with very high hospitalization rates (>44 per 100 000).
 - One modelling study using school reopening and closing data (Netherlands) found that school closure only has a meaningful impact on R values when other population measures are already in place.
 - The remaining four new studies consistently find no impact of school opening on COVID-19 cases or hospitalizations
- One new case study from South Korea is included; very few secondary cases were identified after exposure to confirmed cases in a school setting with rigorous IPAC measures in place

Key Points

- Although the data is consistent that children can both contract and transmit COVID-19, based on published reports to date following re-opening, the risk of transmission from children to children and children to adults in primary school and daycare settings is low, when IPAC measures are in place and adhered to. The certainty of the evidence is moderate (GRADE), and findings may change as new data become available. The risk of transmission within secondary schools is less clear, and findings may be confounded by adherence to IPAC measures in place in the school setting and activities outside of the school settings.
- Within clusters and outbreaks, adult to adult transmission seems to be more common than child to adult or adult to child. Certainty of the evidence is low (GRADE), and findings may change as new data become available.
- Implementation of infection control measures is critically important to limiting spread as evidenced by outbreaks where limited or no measures were in place or measures were not adhered to. Across jurisdictions reviewed, there is wide variability in policies in place limiting the ability to evaluate the impact of specific infection prevention and control measures or make best practice recommendations for daycare or school settings due to variability in measures implemented.

Overview of Evidence and Knowledge Gaps

- Building upon earlier case reports, contact tracing and prevalence studies, there is a growing body of reports using national or regional surveillance data and comprehensive contact tracing and testing strategies to minimize the likelihood of underestimation of cases. While surveillance reports are identifying cases among staff and students and children in schools and daycares, these commonly include single cases or a small number of cases typically less than five.
- A growing number of studies have randomly selected schools/classes/individuals to undergo testing for active infection (via RT-PCR) or antibodies; consistent across studies, few additional cases are detected suggesting that widespread asymptomatic transmission is not commonly occurring in these settings.
- Surveillance data of outbreaks in school and daycare settings in the United States is inconsistent with data reported from other jurisdictions. Interpretation of this data is limited as key details such as index case and information about secondary transmission and infection control measures in place is not provided. Variation across the United States suggesting levels of community transmission is important is consistent with recent analyses from the United Kingdom and Canada.
- Data from overnight camps, and settings where IPAC measures are not in place or adhered to show that widespread transmission from children is possible, and again highlights the importance of infection control measures. Most case reports of widespread transmission in these settings are from adolescents.
- Infection control measures were highly variable across jurisdictions scanned. It is important to note that there may be regional variations in policies in place above what are reported in national guidelines.

Methods

Research Question

What is the specific role of daycares and schools in COVID-19 transmission?

Search

The following databases and sources were searched for evidence pertaining to the role of daycares and schools in the transmission of COVID-19 up to January 11, 2021:

- Pubmed's curated COVID-19 literature hub: [LitCovid](#)
- [Trip Medical Database](#)
- World Health Organization's [Global literature on coronavirus disease](#)
- [COVID-19 Evidence Alerts](#) from McMaster PLUS™
- [COVID-19 Living Overview of the Evidence \(L·OVE\)](#)
- [Prospero Registry of Systematic Reviews](#)
- NCCMT [COVID-19 Rapid Evidence Reviews](#)
- [MedRxiv preprint server](#)
- NCCDH [Equity-informed Responses to COVID-19](#)
- NCCEH [Environmental Health Resources for the COVID-19 Pandemic](#)
- NCCHPP [Public Health Ethics and COVID-19](#)
- NCCID [Public Health Quick Links](#)
- NCCID [Disease Debrief](#)
- NCCIH [Updates on COVID-19](#)
- [Public Health Ontario](#)
- [Institute national d'excellence en santé et en services sociaux \(INESSS\)](#)
- [Uncover \(USHER Network for COVID-19 Evidence Reviews\)](#)
- Centers for Disease Control and Prevention's [Morbidity and Mortality Weekly Report](#)
- Robert Koch Institute [Situation report of the RKI on COVID-19](#)
- Ontario [COVID-19 cases in schools and child care centres database](#)
- Alberta [COVID-19 school status map](#).
- Québec [Situation in Schools](#)
- USA [COVID-19 School Response Dashboard](#)
- Newfoundland and Labrador Centre for Applied Health Research ([NLCAHR](#))
- National Institute for Public Health and the Environment ([RIVM](#))
- [COVID-Explained](#)
- Health Information and Quality Authority ([HIQA](#))
- [Government of Ontario](#)
- National Centre for Immunisation Research and Surveillance ([NCIRS](#))

A copy of the search strategy is available at this [link](#).

Information on policies for child care and educational settings were retrieved from the scientific publications and governmental public health webpages for the jurisdictions included in research articles in this review.

Study Selection Criteria

The search first included recent, high-quality syntheses. If no syntheses were found, single studies were included. English-language, peer-reviewed sources and sources published ahead of print before peer review were included. Grey literature were excluded.

	Inclusion Criteria	Exclusion Criteria
Population	Children and adolescents aged 1–18	Infants
Intervention	Exposure to or diagnosis of COVID-19	
Comparisons	-	
Outcomes	Confirmed or suspected case of COVID-19	
Setting	Schools, daycares, camps	

Data Extraction and Synthesis

Data on study design, setting, location, population characteristics, interventions or exposure and outcomes were extracted when reported. We synthesized the results narratively due to the variation in methodology and outcomes for the included studies.

The identified syntheses relevant to this report had considerable overlap in the primary literature but varied in the data reported across reviews for the same primary studies. We chose to conduct a new synthesis rather than reporting the overlapping results of the identified syntheses in order to present the data most succinctly and clearly. The primary studies were used to extract study characteristics and key findings, and to appraise study quality.

Appraisal of Evidence Quality

We evaluated the quality of included evidence using critical appraisal tools as indicated by the study design below. Quality assessment was completed by one reviewer and verified by a second reviewer. Conflicts were resolved through discussion.

Study Design	Critical Appraisal Tool
Synthesis	Assessing the Methodological Quality of Systematic Reviews (AMSTAR) AMSTAR 1 Tool
Cohort	Joanna Briggs Institute (JBI) Checklist for Cohort Studies
Case Series	Joanna Briggs Institute (JBI) Checklist for Case Series
Case Report	Joanna Briggs Institute (JBI) Checklist for Case Reports
Prevalence	Joanna Briggs Institute (JBI) Checklist for Prevalence Studies
Cross sectional	Joanna Briggs Institute (JBI) Checklist for Analytical Cross Sectional Studies

Completed quality assessments for each included study are available on request.

The Grading of Recommendations, Assessment, Development and Evaluations ([GRADE](#)) approach was used to assess the certainty in the findings based on eight key domains.

In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality** evidence, and this assessment can be further reduced based on other domains:

- High risk of bias
- Inconsistency in effects
- Indirectness of interventions/outcomes
- Imprecision in effect estimate
- Publication bias

and can be upgraded based on:

- Large effect
- Dose-response relationship
- Accounting for confounding.

The overall certainty of the evidence for each outcome was determined taking in to account the characteristics of the available evidence (observational studies, some not peer-reviewed, unaccounted-for potential confounding factors, different tests and testing protocols, lack of valid comparison groups). A judgement of 'overall certainty is very low', means that the findings are very likely to change as more evidence accumulates.

Findings

Summary of Evidence Quality

In this update, 25 new single studies, seven updates to previously included single studies, two new syntheses, and one update to a previously included synthesis were identified, for a total of 88 publications addressing the research question.

In this version a search was undertaken for infection control policies in place in jurisdictions with published data included in this review.

Question	Evidence included	Overall certainty in evidence
What is known about the likelihood of transmission of COVID-19 among children and adults in daycare and schools and among children to their household members?	Syntheses In progress syntheses Single studies In progress single studies	14 3 66 4 Low-Moderate
What infection prevention and control policies or procedures have been implemented in daycares and schools?	Policy documents	26 Not applicable

Warning

Given the need to make emerging COVID-19 evidence quickly available, many emerging studies have not been peer reviewed. As such, we advise caution when using and interpreting the evidence included in this rapid review. We have provided a summary of overall certainty of the evidence to support the process of decision making. Where possible, make decisions using the highest quality evidence available.

Question 1: What is known about the likelihood of transmission of COVID-19 among children and adults in daycare and primary schools and children to their household members?

Table 1: Single Studies

Reference	Date Released	Study Design	Setting, Location	IPAC measures	Summary of Findings	Quality Rating:
New evidence reported January 21, 2021						
Government of Ontario. (2021, Jan 15). COVID-19 cases in schools and child care centres.	Jan 15, 2021	Prevalence	Primary, secondary schools, and child care, Ontario, Canada	<p>Primary and secondary schools have screening measures in place, cohorting classes, and physical distancing for students and staff. Masks required for teachers and students grades 4+.</p> <p>Enhanced cleaning and hand hygiene measures in place. Staggered bell times suggested.¹</p> <p>Child care centres have screening measures in place, cohorting children, and require masks and eye protection for staff. Enhanced cleaning measures in place. Staff must log daily attendance and have a COVID-19 response plan. No non-essential visitors. Drop-off and pick-up protocols in place.²</p>	<p>From Sep 5, 2020-Dec 18, 2020, a total of 7,312 school-related cases were reported in publicly funded schools in Ontario:</p> <ul style="list-style-type: none"> • 5,130 student cases • 1,093 staff cases • 1,089 ‘other’ cases (not identified) <p>As of Jan 15, 2021, 8 (0.04%) schools have reported a case and no schools are closed. (Some Ontario school boards are currently in a remote learning period; as of Jan 12, only data from schools in 7 health unit regions were reported.)</p> <p>From Jun 12, 2020-Jan 15, 2021, a total of 1,853 cases occurred in those connected to child care settings in Ontario:</p> <ul style="list-style-type: none"> • 915 child cases • 938 staff/provider cases <p>Currently, as of Jan 15, 2021, 238 (4.53%) centres have reported a case and 31 (0.59%) centres are closed.</p>	Moderate; NOT PEER REVIEWED

¹ Government of Ontario. (2020, November 27). [Guide to reopening Ontario’s schools.](#)

² Government of Ontario. (2020, Jan 12). [COVID-19: reopening child care centres.](#)

Government of Alberta. (2021, Jan 14). COVID-19 school status map .	Jan 14, 2021	Prevalence	Primary and secondary schools, Alberta	Screening measures in place, cohorting classes, physical distancing for students and staff. Masks required for students and staff when physical distancing cannot be maintained. Enhanced cleaning and hand hygiene measures in place. ³	As of Jan 14, 2021: <ul style="list-style-type: none"> • 15 COVID-19 cases in schools since the return to in-class learning (0.0019% of school population) • 10 schools on alert (i.e., 1 reported case), 2 on outbreak status (i.e., 2+ reported cases) (total n's unknown). 	Moderate; NOT PEER REVIEWED
Bignami-van Assche, S., Boujija, Y., Drouin, O., & Sandberg, J. (2020, Jan 12). Enfants, écoles et COVID-19: le cas montréalais .	Jan 12, 2021	Prevalence	K-12 schools, Montreal, Canada	Student cohorting, physical distancing between cohorts. Staff masking, no student masks required (recommended in red zones). Adherence to measures not reported.	From Aug 25-Dec 18, 2020 ~20% of ~600 schools in Montreal had experienced an outbreak (not defined). From Aug 25, 2020-Jan 5, 2021, cases were detected in 339 schools: <ul style="list-style-type: none"> • 118 (35%) recorded 1 case • 110 (32%) recorded 2-4 cases • 111 (33%) recorded 5+ cases The authors conclude that cases rose disproportionately in children age 10-19, however no statistical analyses were completed. Schools with the largest number of cases occurred in regions with the highest incidence of COVID-19, especially in children.	Low; NOT PEER REVIEWED

³ Government of Alberta. (n.d.). [COVID-19: Education and child care](#).

<p>Zimmerman, K., Akinboyo, I.C., Brookhart, A., Boutzoukas, A.E., McGann, K., Smith, M.J., ... Benjamin Jr., D.K. (2020). Incidence and Secondary Transmission of SARS-CoV-2 Infections in Schools. <i>Pediatrics</i>. Epub ahead of print.</p>	<p>Jan 10, 2021</p>	<p>Prevalence</p>	<p>Child care, primary and secondary schools, North Carolina, United States</p>	<p>Daily screening of students and staff, student and staff masking, efficient contact tracing, regular communication with staff and principles to identify breach in safety protocols, detailed planning with schools.</p>	<p>From Aug 15-Oct 23, 2020, 11 of 56 school districts with >90,000 students attended in-person school. 773 cases were detected.</p> <p>On case detection, contacts were encouraged but not required to undergo testing. Through contact tracing an additional 32 infections were identified.</p> <ul style="list-style-type: none"> • 6 districts had 0 secondary cases • 2 had 1 secondary case • 3 had multiple secondary cases <p>There were 6 cases of secondary transmission in the pre-K setting, 11 in elementary schools, 6 in middle schools, 5 in high schools, and 4 in the K-12 schools. No instances of child-to-adult transmission were reported within schools.</p> <p>Across the entire state, 38 clusters (min of 5 cases) were identified; 2 in charter schools (10 cases), 19 in private schools (191 cases), 15 in-person public schools, and 2 (10 cases) in remote schools.</p>	<p>Moderate</p>
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<p>Government of Québec. (2020, Jan 10). Daily Numbers for the Province – Public and Private School Systems Highlights.</p>	<p>Jan 10, 2021</p>	<p>Prevalence</p>	<p>Public and private school system, Québec</p>	<p>Students placed within cohorts, physical distancing, enhanced cleaning measures in place.</p> <p>Masking regulations are in place: staff and students grades 5+ are required to wear masks. Students in preschool to grade 4 are not required to mask, but masking is recommended. In red zone, all students except preschoolers must wear masks.⁴</p>	<p>Data collected from 2740 public schools and 254 private schools including over 1 300 000 students and 226 000 staff.</p> <p>Confirmed positive cases in the school system from start of school year to Dec 22, 2020:</p> <ul style="list-style-type: none"> Public school system: 14,929 students, 3,558 staff Private school system: 2,443 students; 480 staff Total: 17,372 students (~1.3% of all students); 4,038 staff (~1.8% of all staff) <p>Number of schools that have had a positive case, as of Jan 18, 2021:</p> <ul style="list-style-type: none"> 1116 (37.3%) <p>No schools are closed or partially closed, as of Jan 18, 2021.</p>	<p>Low; <i>NOT PEER REVIEWED</i></p>
<p>National Institute for Public Health and the Environment (RIVM). (2020, January 10). Children, school and COVID-19.</p>	<p>Jan 10, 2020</p>	<p>Prevalence</p>	<p>Primary schools, child care facilities, Netherlands</p>	<p>Mandatory physical distancing of 1.5 meters between staff, but no mandatory distancing between students or between students and staff. Enhanced hand hygiene recommended.</p>	<p>Between Aug 31, 2020-Jan 10, 2021, 9% of over 390,000 people working in education or child care tested positive. This is lower than the 14% positive of over 3.7 million adults tested in the general population at the same time.</p>	<p>Low; <i>NOT PEER REVIEWED</i></p>

⁴ Government of Québec. (2021, Jan 11). [Organization of Educational Activities in 2020-2021 \(COVID-19\).](#)

<p>Gandini, S., Rainisio, M., Iannuzzo, M.L., Bellerba, F., Cecconi, F., & Scorrano, L. (2020). No evidence of association between schools and SARS-CoV-2 second wave in Italy. <i>Preprint</i>.</p>	<p>Jan 8, 2021</p>	<p>Prevalence</p>	<p>Kindergarten, elementary, middle and high schools, Italy</p>	<p>Temperature check and hand hygiene at school entrance; unidirectional flow of students; mandatory masking for teachers and high school students; mandatory masks for all students in common areas, 1m seat distance, frequent ventilation, ban on sports and music, reduce school hours.</p> <p>Mandatory negative test following exposure required in some schools.</p>	<p>From Sept 12-Nov 7, 2020 incidence and positivity were lower amongst elementary and middle school students; compared to the general population; incidence was higher in high school students in 3 of 19 regions. Incidence in teachers was no different from other occupations after adjusting for age.</p> <p>Active contact tracing occurred following case identification; mean number of tests per case ranged from 9-17. Clusters (2+ cases in 1 week) were found in 5-7% of schools with a case.</p> <p>Teacher to teacher transmission (38%) was more common than student to teacher (11%) ($p=0.007$).</p> <p>Incidence by school level:</p> <ul style="list-style-type: none"> • Kindergarten: 0.21% of children and 2.35% of teachers • Elementary: 0.35% of children and 1.83% of teachers • Middle: 0.45% of students and 1.60% of teachers <p>Increase in R values were not associated with staggered school reopening date but were linked to a national election. School closures in two regions did not lower R.</p>	<p>High; <i>PREPRINT</i></p>
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<p>Brendal, L.T., Ofitserova, T.S., Meijerink, H., Rykkvin, R., Lund, H.M., Hungnes, O., ... Winje, B.A. (2020). Minimal transmission of SARS-CoV-2 from paediatric COVID-19 cases in primary schools, Norway, August to November 2020. <i>Eurosurveillance</i>, 26(1).</p>	<p>Jan 7, 2021</p>	<p>Prevalence</p>	<p>Primary schools in two counties, Norway</p>	<p>Symptomatic children asked to stay home, strengthened hygiene measures, physical distancing.</p> <p>Face masks not recommended.</p>	<p>From Aug 28-Nov 11, 2020, all close contacts of child cases identified in schools were asked to participate. Two RT-PCR tests were administered, before and after a 10-day quarantine period.</p> <p>13 index cases and 319 child and 74 adult close contacts were identified, 292 (74%) agreed to participate.</p> <ul style="list-style-type: none"> • Of 234 child contacts tested, 2 cases (0.9%) were identified. • Of 58 adult contacts, 1 case (1.7%) was identified 	<p>High</p>
<p>Ludvigsson, J.F., Engerström, L., Nordenhäll, C., & Larsson, E. (2021). Open Schools, Covid-19, and Child and Teacher Morbidity in Sweden. <i>The New England Journal of Medicine</i>. Epub ahead of print.</p>	<p>Jan 6, 2021</p>	<p>Prevalence</p>	<p>Schools, Sweden</p>	<p>Only primary schools open, masking not mandatory.</p>	<p>From Mar 1-Jun 20, 2020 while schools were open, a low incidence of ICU admission for COVID-19 occurred among children age 1 to 16 and teachers.</p> <p>Compared to other occupations (excluding HCW) the risk of ICU admission for COVID-19 was lower for preschool (RR: 1.10, 95% CI=0.49, 2.49) and school teachers (RR: 0.43, 95% CI=0.28, 0.68) after adjusting for age.</p>	<p>Moderate</p>

<p>Willeit, P., Krause, R., Lamprecht, B., Berghold, A., Hanson, B., Stelzl, E., ... Wagner, M. (2020). Prevalence of RT-PCT-detected SARS-CoV-2 infection at schools: First results from the Austrian School-SARS-CoV-2 Study. <i>Preprint</i>.</p>	<p>Jan 6, 2021</p>	<p>Cohort</p>	<p>Primary schools, Austria</p>	<p>Varies by region</p>	<p>From Sept 29-Oct 22, 2020, a random selection of students (n=9465) and teachers (n=1269) in 245 schools took part in repeat RT-PCT testing every 3-5 weeks.</p> <p>First testing, 7-day community incidence was 75 per 100 000. School prevalence was 0.39%.</p> <ul style="list-style-type: none"> • 209 (86%) schools had 0 cases • 28 (11.5%) schools had 1 case • 6 (2.5%) schools had 2 cases <p>Second testing, 7-day community incidence was 419 per 100 000. School prevalence 1.42%. Fewer schools were tested due to newly implemented school closure</p> <ul style="list-style-type: none"> • 52 (62.5%) schools had 0 cases • 23 (26.1%) schools had 1 case • 9 (10.2%) schools had 2 cases • 4 (4.5%) schools had 3 cases. <p>In adjusted models, odds of a single case were associated with:</p> <ul style="list-style-type: none"> • Regional incidence: two-fold higher incidence, OR: 1.66, 95% CI=1.38, 1.99 • Social deprivation: high/very high vs. low/moderate, OR: 2.05, 95% CI=1.23, 3.42 <p>There was no association between grade (1-4, 5-8), population density, students per class, teacher vs. students, sex, or age of teachers or students.</p>	<p>High; <i>PREPRINT</i></p>
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<p>Harris, D.N., Ziedan, E., & Hassig, S. (2020, Jan 4). The Effects of School Reopenings on COVID-19 Hospitalizations. National Center for Research on Education Access and Choice.</p>	<p>Jan 4, 2021</p>	<p>Cohort</p>	<p>United States</p>	<p>Varied across jurisdictions</p>	<p>Compared to the 10 weeks prior to school reopening, in the first 6 weeks of opening, there was no increase in hospitalizations per 100 000 in counties with reopening of schools in-person or with hybrid learning. Analyses were adjusted for geographic and period-level factors.</p> <p>When analyses were stratified by baseline level of hospitalization, results were inconclusive at the highest rate of >44 per 100 000 per week. Thus, reopening schools may have an impact at this level due to higher rates of community transmission.</p>	<p>High; NOT PEER REVIEWED</p>
<p>Hoehl, S., Kreuzer, E., Schenk, B., Westhaus, S., Foppa, I., Herrmann, I., ... Ciesek, S. (2021). Longitudinal testing for respiratory and gastrointestinal shedding of SARS-CoV-2 in day care centres in Hesse, Germany. <i>Clinical Infectious Diseases</i>. Epub ahead of print.</p>	<p>Jan 3, 2021</p>	<p>Cohort</p>	<p>Day care centres , Germany</p>	<p>Arrival screening for staff and students (runny nose permitted), masks mandatory for staff and adults but not children.</p>	<p>From Jun 18-Sep 10, 2020, 859 children (aged 3 months to 8 years) and 376 staff members from 50 randomly selected daycare centres participated in weekly screening for COVID-19 using buccal mucosa swab, anal swab, and RT-PCR.</p> <p>7,366 buccal mucosa swabs and 5,907 anal swabs were analyzed.</p> <p>No children tested positive for COVID-19; 2 staff (one symptomatic, one asymptomatic) tested positive from 2 different day care centres.</p>	<p>Moderate</p>

<p>Fricchione, M.J., Seo, J.Y., & Arwady, M.A. (2020). Data-Driven Reopening of Urban Public Education Through Chicago's Tracking of COVID-19 School Transmission. <i>Public Health Management & Practice</i>. Epub ahead of print.</p>	<p>Dec 30, 2020</p>	<p>Cohort</p>	<p>Private schools, Chicago, United States</p>	<p>Mandatory masking, physical distancing, daily on-site temperature and symptom checks, access to hand hygiene in every room, quarantining of cohort with identification of a positive case.</p> <p>On site visits and leadership team to follow-up with implementation of measures.</p> <p>No student or teacher test-based screening was required</p>	<p>From Aug 17-Oct 4, 2020, 31 schools reported 59 COVID-19 cases (20 staff, 39 students); the median number of cases per school was 1 (range 1-8). 47 cases were school associated (case had been in the school during the infectious period).</p> <p>Mean community 7-day rolling average was 316 per 100 000, and average test positivity of 4.8%.</p> <p>The majority of multiple cases at a single school were siblings. Contact tracing identified 3 clusters; 2 involved only staff and 1 involved a student and a staff. 2 of 3 clusters were associated with nonadherence to physical distancing outside of school. 1 cluster was potentially transmitted in the classroom.</p>	<p>Moderate</p>
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<p>Kriemle, S., Ulyte, A., Ammann, P., Peralta, G.P., Berger, C., Puhan, M.A., Radtke, T. (2020). Surveillance of acute SARS-CoV-2 infections in school children and point-prevalence during a time of high community transmission in Switzerland. <i>Preprint.</i></p>	<p>Dec 26, 2020</p>	<p>Prevalence</p>	<p>Primary and secondary schools, Switzerland</p>	<p>Mandatory masking (ages 12+), physical distancing, access to hand washing or disinfecting facilities, regular cleaning of surfaces.⁵</p>	<p>From Dec 1–11, 2020 point-prevalence of asymptomatic COVID-19 infections in children (age 6-16) and teachers was assessed in 14 randomly selected schools in areas of high community transmission. Serial testing was completed 1 week via both RT-PCR and a rapid Ag test.</p> <p>National incidence rates were ~4000-5000 per 100 000 per day.</p> <p>Among the 641 children, 1 case was identified (0.2%) via RT-PCR. Among 66 teachers no cases were identified.</p> <p>7 children (1.1%) and 2 teachers (3.0%) tested positive using the rapid test; these results were negative when repeated, thus deemed false positives.</p>	<p>High; PREPRINT</p>
<p>European Centre for Disease Prevention and Control (2020, Dec 23). COVID-19 in children and the role of school settings in COVID-19 transmission.</p>	<p>Dec 23, 2020</p>	<p>Cross-sectional</p>	<p>Preschools, schools, Europe and UK</p>	<p>Measures vary by country</p>	<p>17 European and UK countries responded to a telephone survey about cases or outbreaks in schools:</p> <ul style="list-style-type: none"> • 12 (71%) reported clusters (≥ 2 cases with epidemiological link) <ul style="list-style-type: none"> ○ Secondary schools (n=1,185), primary schools (n=739), preschools (n=283) ○ Number of reported clusters ranged from 1 to 400+ per country ○ Maximum number of cases usually <10, but could also reach 80+ ○ 11/12 countries reported clusters including students and teachers 	<p>Low; NOT PEER REVIEWED</p>

⁵ Federal Office of Public Health of the Swiss Confederation (2020, Dec 11). [Coronavirus: Precautionary measures.](#)

<p>Ulyte, A., Radtke, T., Abela, I.A., Haile, S.R., Berger, C., Huber, M., ... Kriemler, S. (2020). Clustering and longitudinal change in SARS-CoV-2 seroprevalence in schoolchildren: prospective cohort study of 55 schools in Switzerland. <i>Preprint.</i></p>	<p>Dec 22, 2020</p>	<p>Cohort</p>	<p>Primary and secondary schools, Switzerland</p>	<p>Mandatory masking (ages 12+), physical distancing, access to hand washing or disinfecting facilities, regular cleaning of surfaces.⁶</p>	<p>In Jun/Jul and Oct/Nov 2020, classes and schools were randomly selected to take part in seroprevalence testing. 2831 children from 275 classes in 55 schools enrolled. Median participation within each class was 47%.</p> <p>Overall seroprevalence was 2.4% (95% CI= 1.4, 3.6%) in summer and 4.5% (95% CI=3.2, 6.0%) in winter. The proportion ever seropositive was 7.8% (95% CI=6.2, 9.5%).</p> <p>There were no differences by age or sex, but prevalence did differ by district.</p> <p>At least 1 seropositive child was detected in 52 of 55 schools and in 125 of 275 classes (75 of 129 classes with ≥5 children and ≥50% of children tested).</p> <p>7 classes (2.5%) in 5 schools had 3+ cases. Further investigation confirmed teacher to student transmission in 1 cluster, and probable school transmission in 3 clusters. Household transmission was confirmed in the remaining 3 clusters.</p>	<p>Moderate; <i>PREPRINT</i></p>
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⁶ Federal Office of Public Health of the Swiss Confederation (2020, Dec 11). [Coronavirus: Precautionary measures.](#)

<p>Hommes, F., van Loon, W., Thielecke, M., Abramovich, I., Lieber, S., Hammerich, R., ... Mockenhaupt, F.P. (2020). SARS-CoV-2 infection, risk perception, behaviour, and preventive measures at schools in Berlin, Germany, during the early post-lockdown phase: A cross-sectional study. <i>Preprint.</i></p>	<p>Dec 19, 2020</p>	<p>Cross-sectional</p>	<p>Primary and secondary schools, Germany</p>	<p>All schools had implemented some measures; highest rates were for hygiene, information, reduced class sizes and documented absences. Adherence to physical distancing was poor, as was masking.</p> <p>Primary schools adhered to more measures than secondary schools.</p>	<p>From Jun 11-19, 2020, 385 students and 150 staff from 12 primary and 12 secondary schools (randomly selected) were tested for COVID-19 infections and antibodies.</p> <p>One secondary student (0.2%) tested positive for COVID-19. 7 students (1.35%) had detectable antibodies; 3 were from the same secondary class.</p> <p>Among 535 participants (385 students, 150 staff), one teenager was identified as COVID-19 positive (0.2%), and 7 students exhibited specific IgG (1.3%).</p>	<p>Moderate; <i>PREPRINT</i></p>
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<p>Hobbs, C.V., Martin, L.M., Kim, S.S., Kirmse, B.M., Haynie, L., McGraw, S., ... Flannery, B. (2020). Factors Associated with Positive SARS-CoV-2 Test Results in Outpatient Health Facilities and Emergency Departments Among Children and Adolescents Aged <18 Years – Mississippi, September–November 2020. <i>Morbidity and Mortality Weekly Report</i>, 69: 1925-1929.</p>	<p>Dec 18, 2020</p>	<p>Case-control</p>	<p>United States</p>	<p>Varied across jurisdictions</p>	<p>From Sept 1-Nov 5, 2020 397 symptomatic children <18 years old were tested for COVID-19 using RT-PCR. 154 tested positive and 243 tested negative.</p> <p>Cases were more likely to:</p> <ul style="list-style-type: none"> • Be a close contact of a confirmed case, adjusted OR: 3.2, 95% CI=2.0, 5.0 • Attended a gathering with others outside of the household, adjusted OR: 2.4, 95% CI=1.1, 5.5 • Participated in activities with other children, adjusted OR: 3.3, 95% CI=1.3, 8.4 • Have had visitors, adjusted OR: 1.9, 95% CI=1.2, 2.9 <p>Cases were no more likely to attend school, adjusted OR: 0.8, 95% CI=0.5, 1.3.</p> <p>Of those who attended school, cases were less likely to report adherence to mask wearing by staff and students (adjusted OR: 0.4, 95% CI=0.2, 0.8). Controls were more likely to be tested as a requirement for return to school or daycare (p = 0.01).</p>	<p>High</p>
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<p>Children’s Task and Finish Group. (2020, Dec 17). Update to 4th Nov 2020 paper on children, schools and transmission.</p>	<p>Dec 17, 2020</p>	<p>Cross-sectional</p>	<p>Primary and secondary schools, England</p>	<p>Primary: most schools excluded students/staff with symptoms or recent contact, staff distancing, hand hygiene, frequent cleaning, staggered start and end times and distancing of parents; <10% of schools implemented masks or distancing for students.</p> <p>Secondary: most schools implemented masks for staff and students (common areas only), student cohorting and enhanced cleaning; <10% of schools ensured teachers cohorted with a single class, or masks for students in classroom.</p>	<p>6253 students and 4841 staff from 42 primary and 63 secondary schools took part in point-prevalence testing. Enrollment rates were 17% for students and 55% for staff.</p> <p>In high-risk areas, % positivity was:</p> <ul style="list-style-type: none"> • Primary students 1.18%, 95% CI=0.71, 1.83 • Primary staff: 1.13%, 95% CI=0.49, 2.22 • Secondary students, 1.73%, 95% CI=1.17, 2.43 • Secondary staff: 1.62%, 95% CI=1.12, 2.27 <p>In low-risk areas, % positivity was:</p> <ul style="list-style-type: none"> • Primary students: 0% • Primary staff: 0% • Secondary students: 1.12%, 95% CI=0.62,1.90 • Secondary staff: 1.18%, 95% CI=0.61, 2.05 <p>This study did not include students who were self-isolating due to symptoms or recent contact.</p> <p>Noted differences between primary and secondary and between low and high-risk areas should be interpreted with caution due to overlapping confidence intervals.</p>	<p>Moderate; NOT PEER REVIEWED</p>
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<p>Peaper, D.R., Murdzek, C., Oliveira, C., & Murray, T. (2020). Severe Acute Respiratory Syndrome Coronavirus 2 Testing in Children in a Large Regional US Health System During the Coronavirus Disease 2019 Pandemic. <i>The Pediatric Infectious Disease Journal</i>. Epub ahead of print.</p>	<p>Dec 15, 2020</p>	<p>Cohort</p>	<p>All school-age children, Southern Connecticut, New York, Rhode Island, United States</p>	<p>Varied by state</p>	<p>Data for all tests completed from Mar 1-Sept 26, 2020 in those ≤ 18 years of age in a single health system were analyzed.</p> <p>Test positivity did not increase with school reopening (trend: 0.02% per week; 95% CI=-0.06%, 0.09%) overall or by age group. High school (age 15-18) and middle school (age 11-4) consistently had higher rate than children <2, 2-5, and 6-10.</p>	<p>Moderate</p>
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<p>Oster, E. (2020, Dec 11). National COVID-19 School Response Dashboard.</p>	<p>Dec 11, 2020</p>	<p>Prevalence</p>	<p>Schools, United States</p>	<p>Varied by county</p>	<p>From Nov 30-Dec 11, 2020, 4,364,754 students learning in-person and 1,208,015 in-person staff included in the dashboard.</p> <ul style="list-style-type: none"> • Daily case rate was 25 per 100,000 students, with an infection rate of 0.35% (over 2-week period). • Daily case rate was 60 per 100,000 staff, with an infection rate of 0.84% (over 2-week period). • The community case rate in school-matched population was 38 per 100,000, positivity rate of 8.47%. <p>Case rates (per 100,000) by mitigation strategies include:</p> <p><u>Student Masking (mask vs. no mask)</u></p> <p>Community case rate <10:</p> <ul style="list-style-type: none"> • Students: (6 vs 4) • Staff: (28 vs 8) <p>Community case rate 10 to 20:</p> <ul style="list-style-type: none"> • Students: (22 vs 10) • Staff: (64 vs 17) <p>Community case rate >20:</p> <ul style="list-style-type: none"> • Students: (25 vs 29) • Staff: (119 vs 51) <p><u>No 3-foot distance vs 3-foot distance:</u></p> <p>Community case rate <10:</p> <ul style="list-style-type: none"> • Students: (4 vs 4) • Staff: (17 vs 8) <p>Community case rate 10 to 20:</p> <p>Students: (17 vs 11) Staff: (48 vs 25)</p> <p>Community case rate >20:</p> <ul style="list-style-type: none"> • Students: (31 vs 38) • Staff: (86 vs 88) <p><u>Increased ventilation (vs. no)</u></p> <ul style="list-style-type: none"> • Community case rate <10: • Students: (9 vs 3) 	<p>Low; <i>NOT PEER REVIEWED</i></p>
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					<ul style="list-style-type: none"> • Staff: (22 vs 8) <p>Community case rate 10 to 20:</p> <ul style="list-style-type: none"> • Students: (14 vs 11) • Staff: (39 vs 25) <p>Community case rate >20:</p> <ul style="list-style-type: none"> • Students: (40 vs 36) • Staff: (109 vs 82) <p><u>In-person density</u></p> <p>Community case rate <10:</p> <ul style="list-style-type: none"> • Students: <ul style="list-style-type: none"> ○ Density <60%: 9 ○ Density 60-90%: 7 ○ Density >90%: 6 • Staff: <ul style="list-style-type: none"> ○ Remote: 10 ○ Density <60%: 12 ○ Density 60-90%: 17 ○ Density >90%: 21 <p>Community case rate 10 to 20:</p> <ul style="list-style-type: none"> • Students: <ul style="list-style-type: none"> ○ Density <60%: 15 ○ Density 60-90%: 13 ○ Density >90%: 10 • Staff: <ul style="list-style-type: none"> ○ Remote: 21 ○ Density <60%: 20 ○ Density 60-90%: 32 ○ Density >90%: 33 <p>Community case rate >20:</p> <ul style="list-style-type: none"> • Students: <ul style="list-style-type: none"> ○ Density <60%: 23 ○ Density 60-90%: 27 ○ Density >90%: 19 • Staff: <ul style="list-style-type: none"> ○ Remote: 61 ○ Density <60%: 42 ○ Density 60-90%: 70 <p>Density >90%: 69</p>	
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<p>Thielecke, M., Theuring, S., van Loon, W., Hommes, F., Mall, M.A., Rosen, A., ... Mockenhaupt, F.P. (2020). SARS-CoV-2 infections in kindergartens and associated households at the start of the second wave in Berlin, Germany – a cross sectional study. <i>Preprint.</i></p>	<p>Dec 9, 2020</p>	<p>Cross- sectional</p>	<p>Kindergarten, Germany</p>	<p>Most facilities enforced physical distancing between staff, and staff and parents. Staff masks rules were reported in 41.7% of settings. Attendance with common cold symptoms was allowed in 75% of settings. Cohorting and enhanced ventilation were reported universally.</p>	<p>From Sep 28-Oct 2, 2020, 720 individuals in 12 kindergarten programs in Berlin were tested for COVID-19 to assess prevalence of infection among this population.</p> <p>Among those tested, 155 were children, 78 were staff and 487 were household members.</p> <p>701 samples were collected for 98.1% of children, 100% of educators and 96.7% of household members. Of these none were positive. One educator showed positive for COVID-19 antibodies.</p>	<p>Moderate; <i>PREPRINT</i></p>
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<p>Ismail, S.A., Saliba, V., Lopez Bernal, J., Ramsay, M.E., & Ladhani, S.N. (2020). SARS-CoV-2 infection and transmission in educational settings: a prospective, cross-sectional analysis of infection clusters and outbreaks in England. <i>The Lancet Infectious Diseases</i>. Epub ahead of print.</p>	<p>Dec 8, 2020</p>	<p>Cross-sectional</p>	<p>Child care, primary, secondary, schools, England</p>	<p>Screening measures in place, cohorting classes, physical distancing encouraged for staff and for "older children" where possible, masks required for children aged 12+ and staff, enhanced cleaning, ventilation, and hand hygiene measures in place.⁷</p>	<p>From Jun 1–Jul 17, 2020, Public Health England conducted enhanced surveillance including daily monitoring of school.</p> <p>Median attendance was 928,000 students per day (IQR 630,000-1,230,000) in a median of 57 600 settings</p> <p>177 cases were identified; 113 (64%) single cases, 9 (5%) coprimary cases (i.e., from the same household), and 55 (31%) outbreak-associated cases.</p> <p>Rates per 1000 settings per month:</p> <ul style="list-style-type: none"> • Early years: 1.1 (95% CI=0.75, 1.4) • Primary: 6.5 (95% CI=5.3, 7.9) • Secondary: 4.5 (95% CI=2.7, 7.1) <p>Rates per 100 000 students per day:</p> <ul style="list-style-type: none"> • Early years: 18 (CI=14, 24) • Primary: 6.0 (CI=4.3, 8.2) • Secondary: 6.8 (CI=2.7, 14) • Staff: 27 (CI=23, 32) <p>Outbreaks were small (median 2 cases [IQR 2-5]; 29 (53%) involved only one secondary. Number of secondary cases was lower when index case was a child (maximum 6 (median 1 [IQR 1-2]) vs adult (maximum 12, median 1 [IQR 1-5])).</p> <p>For every case introduction, the risk of an outbreak occurring was:</p> <ul style="list-style-type: none"> • Early years: 40% (95% CI=25, 57) • Primary: 26% (95% CI=18, 36) • Secondary: 39% (95% CI=17, 64) <p>Probable direction of transmission</p> <ul style="list-style-type: none"> • Staff-to-staff (n=26) 	<p>Moderate</p>
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					<ul style="list-style-type: none"> • Staff-to-student (n=8) • Student-to-staff (n=16) • Student-to-student (n=5) <p>For every 5 cases per 100 000 in community incidence, the risk of an outbreak increased (RR: 1.72, 95% CI=1.28, 2.30). No association was seen between outbreaks and regional population size or density.</p>	
Rozhnova, G., van Dorp, C.H., Bruijning-Verhagen, P., Bootsma, M.C.J., van de Wijgert, J.H.H.M., Bonten, M.J.M., Kretzschmar, M.E. (2020). Model-based evaluation of school- and non-school-related measures to control the COVID-19 pandemic. <i>Preprint.</i>	Dec 8, 2020	Cohort	Netherlands	Symptomatic or exposed individuals advised to stay at home; physical distancing for teachers only in secondary schools ⁸	<p>Despite high numbers of contacts for children of all ages, and in particular older children (10-20 years), closing schools had less impact on the reproductive number than physical distancing measures outside the school environment.</p> <p>The impact of measures reducing school-based contacts including closure, is dependent on the other opportunities to reduce non-school based contacts.</p> <p>In the context of continued high rates of transmission, if non-school based measures are exhausted or undesired the additional benefit of school-based measures may be considerable. The biggest impact on transmission would be by reducing contacts in secondary schools.</p>	Moderate; <i>PREPRINT</i>

⁷ Government of the United Kingdom. (2020, Dec 18). [Guidance for schools: coronavirus \(COVID-19\)](#).

⁸ National Institute for Public Health and the Environment (RIVM). (2020, January 10). [Children, school and COVID-19](#).

<p>Hoehl, S., Schenk, B., Rudych, O., Göttig, S., Foppa, I., Kohmer, N., ... Ciesek, S. (2020). At-home self-testing of teachers with a SARS-CoV-2 rapid antigen test to reduce potential transmissions in schools. <i>Preprint.</i></p>	<p>Dec 7, 2020</p>	<p>Cohort</p>	<p>Primary and secondary schools, Germany</p>	<p>Not reported</p>	<p>Of 10,836 rapid antigen tests conducted by 602 teachers (mean 18 tests per participant), 5 true positive (0.19%) and 16 false positive tests were recorded. Four false negative tests occurred in symptomatic cases.</p> <p>Among cases, 4 were symptomatic and 1 was pre-symptomatic. All cases were identified when local 7-day incidence was higher than 100 cases/ 100 000.</p>	<p>Moderate <i>PREPRINT</i></p>
<p>Miron, O., Yu, K.H., Wilf-Miron, R., Kohane, I., & Davidovitch, N. (2020). COVID-19 infections following physical school reopening. <i>Archives of Disease in Childhood.</i> Epub ahead of print.</p>	<p>Dec 7, 2020</p>	<p>Cohort</p>	<p>Primary and secondary schools, Florida, United States</p>	<p>Varied</p>	<p>In counties with in-person learning incidence increased daily once schools re-opened. In elementary schools on day 4, the incidence was 11/100 000 (95%CI=9.9, 12) and increased to 12.8 (95%CI=11.7, 13.9), 1.2-fold by day 20. No trend was observed in counties that did not re-open.</p> <p>Among secondary schools with in-person learning incidence increased daily once schools re-opened. On day 1, the incidence was 16.1 (95%CI=14.4, 17.9), and on day 20, it increased to 20.5 (95%CI=18.5, 22.5), 1.3 fold.</p> <p>No trend was observed in counties that did not re-open.</p> <p>The authors note that counties that offered remote learning also had public mask mandates, limits on public gatherings, and socioeconomic differences that may confound results.</p>	<p>Moderate</p>

<p>Jones, R.D. (2020). COVID-19 Trends in Florida K-12 Schools, August 10 – November 14, 2020. <i>Preprint</i>.</p>	<p>Dec 3, 2020</p>	<p>Prevalence</p>	<p>Primary and secondary schools, Florida, United States</p>	<p>Varied by district; 87% districts mandated masks, however 38% of in-person classes did not require masks</p>	<p>From Aug 10-Nov 14, 2020, 10,088 student and 4,507 staff cases were detected in schools.</p> <p>61% of students attended in-person instruction.</p> <p>Case numbers varied between school grade level and between students and staff. Not all rates were reported.</p> <p>Incidence rates among high school students (12.5) vs. younger cohorts (7.4), no statistical analyses were conducted.</p> <p>The authors state that staff rates were higher than student rates no data were reported.</p> <p>Staff case rate in districts without mask mandates (29.2 per 1,000) was nearly twice that of staff case rates in districts with mandatory mask mandates (14.8)</p>	<p>Low; <i>PREPRINT</i></p>
<p>Manny, E., Carroll, A., Charlton, C., Robinson, J., Subbarao, P., Azad, M.B., ... Mandhane, P.J. (2020). Increased Mask Use and Fewer Gatherings Associated with Lower SARS-CoV-2 Seropositivity Among Young School-Age Children. <i>Preprint</i>.</p>	<p>Dec 3, 2020</p>	<p>Cross-sectional</p>	<p>School-age children, Edmonton, Canada</p>	<p>Variable</p>	<p>This analysis includes 565 children age 8-13 years old enrolled in a longitudinal study.</p> <p>Neither age, sex, school attendance or sport participation were associated with seropositivity.</p> <p>Mask wearing decreased odds of positivity, and large gatherings increased risk.</p>	<p>High; <i>PREPRINT</i></p>

<p>Yoon, Y., Kim, K.R., Park, H., Kim, S.Y., & Kim, Y.J. (2020). Stepwise School Opening Online and Off-line and an Impact on the Epidemiology of COVID-19 in the Pediatric Population. <i>Journal of Korean Medical Sciences</i>, 35(46): e414.</p>	<p>Nov 20, 2020</p>	<p>Prevalence</p>	<p>Kindergarten, primary and secondary schools, South Korea</p>	<p>Screening measures, temperature checks, reduced class sizes, and physical distancing implemented. Masks required for staff and for students when indoors. Enhanced cleaning and hand hygiene measures in place. Plastic barriers present at lunch.</p>	<p>Report of phased school opening for all grades from May 20-Jun 8, data collected to Jul 11. Proportion of pediatric cases nationally remained constant (~7.0%).</p> <p>As of July 31, 44 children from 38 schools and kindergartens had confirmed COVID-19 cases. Additional testing of more than 13,000 students and staff found only one additional student case.</p> <p>29 of the 44 cases had an identifiable source, 23 of which were family members. Older children were more likely to have unknown source than younger children (52.4% vs 17.4%, $p=0.014$). 80% of younger children were infected by a family member; the proportion of students infected by family members decreased with age ($p<0.001$).</p>	<p>Moderate</p>
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<p>National Centre for Immunisation Research and Surveillance. (2020, October 21). COVID-19 in schools and early childhood education and care services – the Term 3 experience in NSW.</p>	<p>Oct 21, 2020</p>	<p>Cohort</p>	<p>Child care and schools, Australia</p>	<p>In primary and secondary schools, students must stay home if unwell and negative tests are required to return to school after showing symptoms of COVID-19. Cohorting classes, physical distance between staff, and enhanced cleaning and hand hygiene measures in place. Parents and carers are not allowed on school sites or at school events, except for select purposes.</p> <p>In child care, screening and cohorting measures are in place, as well as enhanced cleaning and hand hygiene measures.⁹</p>	<p>From Jul 4-Sep 25, 2020, 39 individuals (32 students and 7 staff members) from 34 educational settings (28 schools and 6 child care services) were confirmed as primary COVID-19 cases (community acquired) who had an opportunity to transmit the virus to others in their school or child care setting.</p> <p>3,824 individuals (3,439 students and 385 staff members) were identified as close contacts of the primary cases.</p> <p>33 secondary cases (28 students and 5 staff members) occurred in 10 educational settings (5 high schools, 3 primary schools, 2 child care centres).</p> <ul style="list-style-type: none"> • Outbreaks were identified in four high schools. The secondary attack rate in high schools was 1.1%. • There were no outbreaks within primary schools setting. • There was one outbreak in a child care <p>The overall secondary transmission rate was 0.9% (33/3,641) for all settings: 1.1% in high schools, 0.4% in primary schools and 0.7% in ECEC services. The highest rate of transmission in primary schools and ECEC services was among adults, at 6.6%.</p>	<p>Moderate; <i>NOT PEER REVIEWED</i></p>
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⁹ New South Wales Government. (2020, December 8). [Advice for Families.](#)

Previously reported evidence						
Larosa, E., Djuric, O., Cassinadri, M., Cilloni, S., Bisaccia, E., Vicentini, M., ... Reggio Emilia Covid-19 Working Group. (2020). Secondary transmission of COVID-19 in preschool and school settings in northern Italy after their reopening in September 2020: a population-based study. <i>Eurosurveillance</i> , 25(49): pii=2001911.	Dec 10, 2020	Cohort	Preschools, primary schools, middle schools, high schools, Italy	Physical distancing between students, mandatory masking for staff and students ages 6+. ¹⁰	From Sep 1-Oct 15, 2020 after the reopening of schools, across 41 classes in 36 different schools [8 preschools (aged 0-5 years), 10 elementary (aged 6-10 years), 5 middle (aged 11-13 years), 13 high schools (aged 14-19 years)], 994 students and 204 teachers were tested following the identification of 48 primary cases (43 students, 5 teachers). 38 secondary cases (3.82% attack rate) were identified among students in 1 elementary school, 2 middle schools, and 6 high schools. The attack rate was higher in high and middle schools (6.6%) vs. elementary schools (0.38%). There were no secondary cases in preschools or among teachers. Most routes of transmission appear to have been from an infected family member or close contact. Only one middle school appears to have had transmission within the school, with the index cases possibly being teachers.	Moderate

¹⁰ Ministero dell'Istruzione. (2020, August 6). [Documento di indirizzo e orientamento per la ripresa delle attività in presenza dei servizi educative e delle scuole dell'infanzia.](#)

<p>Robert Koch Institute. (2020, Nov 30). Coronavirus Disease 2019 (COVID-19) Daily Situation Report of the Robert Koch Institute.</p>	<p>Nov 30, 2020</p>	<p>Prevalence</p>	<p>Child care, schools, after school care, other educational facilities, children's homes, camps , Germany</p>	<p>Varied across country</p>	<p>Of 1,053,869 total cases in Germany from Jan-Nov 30, 30,460 (2.9%) were in those cared for or attending child care/school/camp settings and 14,120 (1.3%) were in staff employed in these settings. No information available on source of exposure or the total number of staff and students who attended during the time period. Prevalence was lower than other settings such as hospitals and clinical settings (3.6% of total), congregate living settings (5.4% of total). No data is given on the number of people employed in these settings.</p>	<p>Moderate; NOT PEER REVIEWED</p>
<p>Armann, J.P., Unrath, M., Kirsten, C., Lück, C., Dalpke, A.H., & Berner, R. (2020). SARS-CoV-2 IgG antibodies in adolescent students and their teachers in Saxony, Germany (SchoolCoviDD19): persistent low seroprevalence and transmission rates between May and October 2020. Preprint.</p>	<p>Nov 29, 2020</p>	<p>Cross-sectional</p>	<p>Schools, Germany</p>	<p>No measures described</p>	<p>After school reopening in May/Jun, out of 2045 individuals (1538 students grades 8-11; 503 teachers), seroprevalence was 0.6% (12/2045) including 11 seropositive students and 1 teacher.</p> <p>In Sep/Oct, out of 1779 individuals (1334 students; 445 teachers), seroprevalence was 0.7% (12/1779) including 11 seropositive students and 1 teacher.</p> <p>Seropositive individuals were detected in 7/13 schools, with 4 in one school as the max. Seroprevalence ranged from 0 to 2.2 per individual school.</p> <p>During the study period, SARS-CoV-2 infections per 100,000 in the community increased from 139 to 245.</p>	<p>Moderate; PREPRINT</p>

<p>COVID-Explained. (2020, Nov 9). Data Overview: Child Care Centers, Camps, and Outbreaks.</p>	<p>Nov 9, 2020</p>	<p>Surveillance (crowd-sourced)</p>	<p>Child care, camps, schools, United States</p>	<p>Infection control measures and community transmission vary within and across state.</p>	<p>State-level data as of Nov 9 (unless noted):</p> <ul style="list-style-type: none"> • Arizona: As of Nov 8, 97 child care facilities with cases • California: As of Nov 5, of 9968 open child care facilities, 2164 cases reported (47% staff, 25% children, 25% parents, 2% other) • Colorado: As of Nov 4, 48 child care facilities have reported outbreaks (active and resolved) with 178 lab-confirmed cases (71% staff, 29% children) • Kansas: As of Nov 8, 17 outbreaks in daycares with 78 cases (3 hospitalizations) and 52 outbreaks in schools with 508 cases (8 hospitalizations, 1 death) • Minnesota: As of Nov 5, of 755 child care programs with confirmed cases, 503 have had 1 case, 208 have had 2-4 cases, and 44 have had 5 or more cases. There have been 813 cases amongst child care staff and 412 amongst children • Nevada: As of Nov 8, there have been 64 confirmed cases (31% child, 69% staff) in 38 out of 443 total child care facilities • North Carolina: As of Nov 6, 37 schools (total 328 cases, 42% staff, 58% children) and 18 daycares (total 112 cases, 61% staff, 39% children) had clusters • Ohio: As of Jul 28, 442 reported cases linked to child care (69% staff, 31% children), 75% determined to be acquired through community spread • Oregon: As of Nov 4, 16 active outbreaks with 71 reported cases in child care facilities (9 outbreaks, with 67 cases resolved) 	<p>Not rated; <i>NOT PEER REVIEWED</i></p>
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					<ul style="list-style-type: none"> • Pennsylvania: As of Nov 6, 269 child or parent and 369 staff cases reported in licensed child care facilities • Rhode Island: Between Jun 1–Jul 31, of 666 total child care centres, 29 had confirmed cases (17 children and 16 staff) • Texas: As of Nov 5, 1891 child and 3436 employee reported cases among 2802 total facilities • Tennessee: As of Jul 14, 47 facilities with positive cases • Utah: As of Nov 8, 54 current outbreaks with 255 cases (5 hospitalizations) in child care settings (median age 23); 7940 cumulative school-associated cases (13% teachers, 75% students, and 12% other/unknown). • Virginia: As of Nov 8, 67 outbreaks with 334 cases in child care settings, 45 outbreaks with 246 cases in schools 	
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<p>Mossong, J., Mombaerts, L., Veiber, L., Pastore, J., LeCoroller, G., Schnell, M., ... Wilmes, P. (2020). SARS-CoV-2 Transmission in Educational Settings During an Early Summer Epidemic Wave in Luxembourg. <i>Preprint</i>.</p>	<p>Oct 26, 2020</p>	<p>Cohort</p>	<p>Preschool, primary school, secondary school, Luxembourg</p>	<p>In primary and secondary schools, students have fewer contacts outside classrooms and have limited movements. Masks required for students aged 6+ outside of the classroom. Teachers must wear masks and observe physical distancing. Enhanced cleaning, hand hygiene, and ventilation (CO₂ detectors made available) in place. Breaks are staggered.</p> <p>In preschools, staff are required to physically distance and wear masks. Enhanced cleaning, ventilation, and hygiene measures are in place. Recommended to avoid using toys that cannot be properly cleaned.¹¹</p>	<p>From May 4-Jul 25, there were 424 confirmed cases among students and teachers:</p> <ul style="list-style-type: none"> • 176 pre- and primary school students (41.5%) • 214 secondary school students (50.5%) • 16 primary school teachers (3.8%) • 18 secondary school teachers (4.3%) <p>Probable sources of transmission included:</p> <ul style="list-style-type: none"> • Infected family member (42.5%) • School (11.6%) • Friend (3.8%) • From another or multiple sources (4.2%) • Unknown (37.5%) <p>Of 228 cases that attended school while infectious, 29 cases led to 49 secondary cases (school transmission).</p> <p>Of the 49 secondary cases:</p> <ul style="list-style-type: none"> • 38 (78%) were student-to-student, same class • 7 (14%) were teacher-to-student • 3 (6%) were student-to-teacher • 1 was teacher-to-teacher transmission. <p>The effective reproductive rate in schools was 0.27.</p> <p>Comparing Luxembourg's two waves (Mar-Apr and Jul), incidence was lower in school-age children (28 per 100,000) compared to adults (208 per 100,000; IRR=0.13, 95% CI=0.09, 0.19) in the first wave; there were no differences between groups in the second wave. Incidence was lower in students compared to</p>	<p>Moderate; <i>PREPRINT</i></p>
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					<p>teachers during the first wave (IRR=0.20, 95% CI=0.12, 0.34), but both teachers and students were affected during the second.</p> <p>Positivity rates were lower in children (5.1%) than in adults (10.9%) during the first wave, but were more similar (1.2% and 0.82%, respectively) in the second.</p>	
<p>Cooch, P., Watson, A., Olarte, A., Crawford, E., CLIAhub Consortium, DeRisi, J., ... Bardach, N. (2020). Supervised self-collected SARS-CoV-2 testing in indoor summer camps to inform school reopening. <i>Preprint.</i></p>	Oct. 23, 2020	Cross-sectional	Camp, California, United States	Cohorting campers, staff masks other than eating, arrival temperature check.	<p>163 participants (including 67 campers, 76 household contacts and 20 staff) self-collected nasal and saliva swabs at the beginning and end of 2 summer camps (between 3-5 weeks apart). No positive RT-PCR tests for SARS-CoV-2 were found at either timepoint.</p> <p>Seven participants (4%, 95% CI=1%, 7%) tested positive for SARS-CoV-2 antibodies at one or more timepoints.</p> <p>It was not possible to determine whether any transmission occurred between participants in this study as no documented cases occurred during camps.</p>	High; <i>PREPRINT</i>

¹¹ Le Gouvernement du Grand-Duché de Luxembourg. (2021, Jan 12). [Questions and answers : Measures related to COVID-19 in schools and childcare facilities.](#)

<p>Buonsenso, D., De Rose, C., Moroni, R., & Valentini, P. (2020). SARS-CoV-2 infections in Italian schools: preliminary findings after one month of school opening during the second wave of the pandemic. <i>Preprint.</i></p>	<p>Oct 11, 2020</p>	<p>Prevalence</p>	<p>Preschool/ kindergarten schools, Italy</p>	<p>Screening, cohorting, masks for staff only, hand hygiene, enhanced cleaning, ventilation.</p>	<p>From Sept 3-Oct 5, 2020, 1350 cases linked to 1212 (1.8%) Italian schools were reported on an open access database that covers media reports of school cases. This included: 1059 students, 145 teachers and 146 others.</p> <p>Of schools reporting cases, 92.7% had 1 case; 1 cluster of 10 or more students (secondary school) was identified.</p> <p>Students made up a greater proportion of total cases in middle and secondary schools, compared to nursery/kindergartens, primary schools, and peer schools.</p>	<p>Low; <i>PREPRINT</i></p>
<p>Gilliam, W.S., Malik, A.A., Shafiq M., Klotz, M., Reyes, C., Humphries, J.E., ... Omer, S.B. (2020). COVID-19 Transmission in US Child Care Programs. <i>Pediatrics.</i> Epub ahead of print.</p>	<p>Oct 1, 2020</p>	<p>Cross-sectional</p>	<p>Child care , United States</p>	<p>Varied by setting.</p> <p>Child care centres that were open reported high rates of infection mitigation strategies such as increased cleaning, cohorting and smaller group sizes.</p>	<p>Among 57,335 child care providers who participated in the study:</p> <ul style="list-style-type: none"> • 51.4% reported their child care facility closed near the start of the pandemic and remained closed. • 48.6% reported their child care facility did not close, closed but had reopened, or closed at a later date due to a confirmed or suspected case of COVID-19. <p>No association was found between exposure to child care and COVID-19 in both unmatched (OR=1.06; 95% CI=0.82, 1.38, p=0.66) and matched (OR=0.94; 95% CI=0.73, 1.21, p=0.64) analyses.</p> <p>Findings must also be interpreted in the context of community transmission rates.</p>	<p>Moderate</p>

<p>Otte im Kampe, E., Lehfeld, A. S., Buda, S., Buchholz, U., & Haas, W. (2020). Surveillance of COVID-19 school outbreaks, Germany, March to August 2020. <i>Eurosurveillance</i> 25(38).</p>	<p>Sep 24, 2020</p>	<p>Prevalence</p>	<p>Schools, Germany</p>	<p>Varies across jurisdictions</p>	<p>From Jan 28-Aug 31, 2020, 48 outbreaks (0.5% of all in Germany) occurred in schools.</p> <p>Of the 216 cases:</p> <ul style="list-style-type: none"> • 102 (47.2%) were in adults age >21 • 39 (18.1%) in students aged 15-20 • 45 (21.8%) in students aged 11-14 • 30 (13.9%) in students aged 6-10 <p>5 school outbreaks were linked to outbreaks in other settings.</p> <p>In 10 outbreaks (21%), only adult cases occurred. In 29 outbreaks (60%), only one grade was affected.</p> <p>Most outbreaks had a small number of cases; only 2 outbreaks (both prior to school lockdown) had >10 cases. Thus, while there is some indication of transmission in schools, relative to the number of staff and students, data suggests this transmission is limited.</p>	<p>High</p>
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<p>Ulyte, A., Radtke, T., Abela, I.R., Haile, S.R., Blankenberger, J., Jung, R., ... Kriemler, S. (2020). Variation in SARS-CoV-2 seroprevalence in school-children across districts, schools and classes. <i>Preprint.</i></p>	<p>Sep 18, 2020</p>	<p>Prevalence</p>	<p>Schools, Zurich, Switzerland</p>	<p>Mandatory masking (ages 12+), physical distancing, access to hand washing or disinfecting facilities, regular cleaning of surfaces.¹²</p>	<p>From Jun 16–Jul 9, 2020, testing of 2585 children in 55 randomly selected schools found a seroprevalence rate of 2.8% (95% CI 1.6-4.1%). Participation rate was 45% (5% to 94% across classes).</p> <p>Seroprevalence rates were higher in younger children:</p> <ul style="list-style-type: none"> • Grades 1-2 = 3.8% (95% CI=1.9, 6.1%) • Grades 4-5 = 2.5% (95% CI=1.1, 4.2%) • Grades 7-8 = 1.5% (95% CI=0.5, 3.0%) <p>Seroprevalence rates were similar in adults, however PCR confirmed cases were much higher for adults (0.24% vs 0.03%).</p> <p>The number of classes with seropositive children was very small suggesting little evidence of major school transmission.</p> <p>Schools were closed between Mar 16-May 10, 2020.</p>	<p>Moderate; <i>PREPRINT</i></p>
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¹² Federal Office of Public Health of the Swiss Confederation (2020, Dec 11). [Coronavirus: Precautionary measures.](#)
Update 12: January 21, 2021

<p>Ehrhardt, J., Ekinci, A., Krehl, H., Meincke, M., Finci, I., Klein, J., ... Brockmann, S.O. (2020). Transmission of SARS-CoV-2 in children aged 0 to 19 years in childcare facilities and schools after their reopening in May 2020. Baden-Württemberg, Germany. <i>Eurosurveillance</i> 25(36): pii=2001587.</p>	<p>Sep 10, 2020</p>	<p>Prevalence</p>	<p>Children's homes, child care, schools Germany</p>	<p>Reduced class sizes, masking for staff, enhanced cleaning, ventilation and hand hygiene measures in place.</p>	<p>557 confirmed cases in children 0-19 in Baden-Württemberg, Germany May 25-Aug 5, 1 week after opening to 1 week after summer closure. School data available for 453 cases; 137 attended school or child care for at least 1 day during infectious period.</p> <p>Source of transmission was primarily household (41.9%), followed by event (8.4%), school or child care (3.3%), church (3.1%), travel (1.1%). 41.3% had unknown source, but unlikely to be school or child care due to close examination of close contacts.</p> <p>In a school or child care setting, 11 cases were infected by another pupil and 4 cases infected by a teacher.</p> <p>Across settings, group sizes reduced by 50%, enhanced cleaning, ventilation, exclusion of sick children and hand hygiene. Masks not required for students in the class but were required outside for some primary and secondary schools. Physical distancing only required for secondary school.</p>	<p>Moderate</p>
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<p>Macartney, K., Quinn, H.E., Pillsbury, A.J., Koirala, A., Deng, L., Winkler, N., ... Chant, K. (2020). Transmission of SARS-CoV-2 in Australian educational settings: a prospective cohort study. <i>The Lancet Child & Adolescent Health</i>, 4(11), 807-816.</p>	<p>Aug 3, 2020</p>	<p>Cohort</p>	<p>Daycare, primary and secondary schools, New South Wales, Australia</p>	<p>In primary and secondary schools, students must stay home if unwell and negative tests are required to return to school after showing symptoms of COVID-19. Cohorting classes, physical distance between staff, and enhanced cleaning and hand hygiene measures in place. Parents and carers are not allowed on school sites or at school events, except for select purposes.¹³</p> <p>In daycares, screening and cohorting measures are in place, as well as enhanced cleaning and hand hygiene measures.¹⁴</p>	<p>From Jan 25-Apr 10, all lab-confirmed COVID-19 cases in children or staff who attended school or daycare within 24h of symptom onset.</p> <p>15 adults, 12 children (8 secondary school, 1 primary school, 3 daycare) attended while infectious.</p> <p>Of 1448 close contacts identified, 43.7% had RT-PCR testing. Secondary transmission occurred in 4 of 25 settings.</p> <p>In schools, 5 secondary cases (3 children, 2 adults) were identified in 3 schools.</p> <p>No secondary transmission occurred in 9 of 10 daycares, however one outbreak was identified where 6 adults and 7 children were infected.</p> <p>Secondary attack rate of staff to staff was 4.4%, staff to child 1.5%, child to staff 1.0% and child to child 0.3%.</p>	<p>Moderate</p>
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¹³ New South Wales Government. (2020, December 8). [Advice for Families](#).

¹⁴ New South Wales Government. (2020, March 16). [COVID-19 \(Coronavirus\) – Guidance for early childhood education and care services](#).

<p>National Centre for Immunisation Research and Surveillance. (2020, Jul 31). COVID-19 in schools and early childhood education and care services – the Term 2 experience in NSW.</p>	<p>Jul 31, 2020</p>	<p>Cohort</p>	<p>Daycare, primary and secondary schools, New South Wales, Australia</p>	<p>In primary and secondary schools, students must stay home if unwell and negative tests are required to return to school after showing symptoms of COVID-19. Cohorting classes, physical distance between staff, and enhanced cleaning and hand hygiene measures in place. Parents and carers are not allowed on school sites or at school events, except for select purposes.¹⁵</p> <p>In daycares, screening and cohorting measures are in place, as well as enhanced cleaning and hand hygiene measures.¹⁶</p>	<p>Surveillance data from Apr 10-Jul 3 while all daycares were open, and schools were undergoing gradual reopening. Schools were fully reopened with face-to-face learning by May 25.</p> <p>Daycare:</p> <ul style="list-style-type: none"> • 1 child with confirmed COVID-19 had contact with 84 students and 18 staff in school • 82% of contacts were tested; none tested positive <p>Primary school:</p> <ul style="list-style-type: none"> • 1 child with confirmed COVID-19 had contact with 15 students and 4 adults in school • 57% of contacts were tested; none tested positive <p>Secondary school:</p> <ul style="list-style-type: none"> • 2 adolescents with confirmed COVID-19 had contact with a total of 165 students and 23 adults in school • 55% of contacts were tested; none tested positive 	<p>Moderate; <i>NOT PEER REVIEWED</i></p>
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¹⁵ New South Wales Government. (2020, December 8). [Advice for Families.](#)

¹⁶ New South Wales Government. (2020, March 16). [COVID-19 \(Coronavirus\) – Guidance for early childhood education and care services.](#)

<p>Public Health Agency of Sweden. (2020, Jul 7). Covid-19 in schoolchildren A comparison between Finland and Sweden.</p>	<p>Jul 7, 2020</p>	<p>Prevalence</p>	<p>Preschool, primary school, secondary schools, Sweden Finland</p>	<p>In Finland, all schools were closed in Mar 2020.</p> <p>In Sweden only secondary and post-secondary schools were closed.</p>	<p>As of Jun 14, 2020: In Finland, 584 out of 7,110 (8.2%) reported cases of COVID-19 were among children ages 1-19 years. Age-specific rates were:</p> <ul style="list-style-type: none"> • 1-5 years: 36 per 100 000 • 6-15 years: 42 per 100 000 • 16-19 years: 98 per 100 000 <p>Primary school closures and reopening in Finland did not impact weekly number of reported COVID-19 cases.</p> <p>In Sweden, 1,124 out of 52,424 (2.1%) reported cases of COVID-19 were among children ages 1-19 years. Age-specific rates were:</p> <ul style="list-style-type: none"> • 1-5 years: 16 per 100 000 • 6-15 years: 30 per 100 000 • 16-19 years: 150 per 100 000 <p>No increased risk of infection was found amongst Swedish school or daycare staff:</p> <ul style="list-style-type: none"> • Daycare, Relative Risk (RR) = 0.9 (95% CI=0.7, 1.1) • Primary school, RR = 1.1 (95% CI=0.9, 1.3) • Secondary school, RR = 0.7 (95% CI=0.5, 1.0) 	<p>Low; NOT PEER REVIEWED</p>
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<p>Stage, H.B., Shingleton, J., Ghosh, S., Scarabel, F., Pellis, L., & Finnie, T. (2020). Shut and re-open: the role of schools in the spread of COVID-19 in Europe. <i>Preprint.</i></p>	<p>Jun 26, 2020</p>	<p>Cohort</p>	<p>Germany Denmark Norway Sweden</p>	<p>Preschool, primary school, secondary school infection control measures vary by country.</p>	<p>Timing of school closures coincided with a reduction in the growth rate of COVID-19 cases and hospitalizations compared to data models with no intervention. However, implementation of concurrent community interventions (e.g., travel restrictions, social distancing, banned gatherings) mean is it difficult to determine which interventions were most effective.</p> <p>Reopening of schools among younger student groups and those participating in exams did not result in a significant increase in rates of COVID-19.</p> <p>In countries with low community transmission of COVID-19, return of all students did not appear to increase transmission.</p> <p>The return of older students in a country of high community transmission levels appeared to increase transmission among students but not staff.</p>	<p>Moderate; <i>PREPRINT</i></p>
<p>Folkhälsomyndigheten. (2020, May 27). Förekomst av covid-19 i olika yrkesgrupper.</p>	<p>May 27, 2020</p>	<p>Prevalence</p>	<p>Preschool, primary school, secondary schools, Sweden</p>	<p>In preschools, primary schools, and secondary schools, masks are not required. In preschools, if a child becomes unwell, they must stay home for 48 hours after recovery. For all schools, no other measures are reported.¹⁷</p>	<p>National public health data and census data were used to determine the relative risk of COVID-19 infection for various occupations. For occupations working with children, such as primary and secondary school teachers, preschool teachers and nannies, the relative risk of COVID-19 infection was no different than other occupations.</p> <p>Notably, Sweden has not implemented nationwide lockdown measures.</p>	<p>Moderate; <i>NOT PEER REVIEWED</i></p>

¹⁷ Public Health Agency of Sweden. (2020, Dec 21). [COVID-19.](#)

Table 2: Case reports and case series following school reopening

Reference	Date Released	Location, Setting	Infection prevention and control measures in place	Summary of Findings	Quality Rating:
New evidence reported January 21, 2021					
Kruger, O., Lustig, Y., Cohen, C., Amit, S., Biber, A., Barkai, G., ... Regev-Yochay, G. (2020). The Sheba Medical Center healthcare workers' children's school: can we open schools safely? <i>Clinical Microbiology and Infection</i> . Epub ahead of print.	Dec 9, 2020	Alternative school for healthcare workers, Israel	Reduced class size, rigorous cleaning, staff masks, physical distancing	<p>Of 435 children attending, 53 were tested for COVID-19 after exposure to a teacher at the school who had community-acquired infection. None tested positive.</p> <p>Overall, there was no evidence of increased infection among children who attended the alternative school (n=70) compared to those who stayed at home (n=36).</p> <p>16% of all students (11 attending the school and 6 staying at home) developed symptoms consistent with COVID-19 and were tested. None were positive.</p> <p>Serologic testing indicated that previous exposure to COVID-19 was low and not significantly different between the groups.</p>	Moderate
Previously reported evidence					
Cai, J., Wang, X., Zhao, J., Ge, Y., Xu, J., Tian, H., ... Zeng, M. (2020). Comparison of Clinical and Epidemiological Characteristics of Asymptomatic and Symptomatic SARS-CoV-2 Infection in Children. <i>Virologica Sinica</i> . Epub ahead of print.	Nov 4, 2020	Household, community China	Not reported	<p>From Jan 19-Apr 30, 49 children were infected (mean age 11.5 ± 5.12 years).</p> <p>21 children (43%), had a known exposure within:</p> <ul style="list-style-type: none"> • Household (15; 71.4%) • School dormitory (5; 23.8%) • Travel bus (1; 4.8%) 	Low

<p>Pray, I.W., Gibbons-Burgener, S.N., Rosenberg, A.Z., Cole, D., Borenstein, S., Bateman, A., ... Westergaard, R.P. (2020). COVID-19 Outbreak at an Overnight Summer School Retreat — Wisconsin, July–August 2020. <i>Morbidity and Mortality Weekly Report</i> 69(43): 1600-1604.</p>	<p>Oct 30, 2020</p>	<p>Community/ Summer Camp Wisconsin, United States</p>	<p>All attendees provided a negative COVID-19 test (last 7 days or serology in last 3 months) and were asked to self-quarantine for 7 days, and prior to wear masks while travelling.</p>	<p>127 students, 21 counsellors (aged 17-24 years) and 4 staff members from 21 states and 2 foreign countries attended camp from Jul 2-Aug 11.</p> <p>The index case (grade 9 student) developed COVID-19 symptoms on Jul 3 and tested positive on Jul 5.</p> <p>Despite efforts to isolate close contacts, 116/152 (76%) of attendees had confirmed (n=78) or probable (n=38) COVID-19. This included:</p> <ul style="list-style-type: none"> • 100/127 students (79%) • 15/21 counsellors (71%) • 1 staff member (25%) <p>Excluding the 24 attendees who provided positive serologic results prior to camp, the attack rate = 91% (116/128).</p>	<p>High</p>
<p>Okarska-Napierala, M., Mańdziuk, J., & Kuchar, E. (2020). SARS-CoV-2 Cluster in Nursery, Poland. <i>Emerging Infectious Disease</i>, 27(1).</p>	<p>Oct 9, 2020</p>	<p>Child care, Poland</p>	<p>Cohorting children and masking staff when in contact with children have both been implemented.</p>	<p>Following lockdown, a child care facility reopened on May 18. The facility was closed on May 31 following a staff worker's contact with a symptomatic COVID-19 case (family member). The staff member tested positive on Jun 4. Subsequent testing of 2 initial case patients and 104 contacts found positive cases for:</p> <ul style="list-style-type: none"> • 4 nursery workers (1 who was also a parent of a child at the facility) • 3 children of staff • 8 children attending the facility • 3 siblings of those children • 8 parents • 1 grandparent <p>Overall positivity rate was 27%.</p>	<p>Low</p>

<p>Fong, M.W., Cowling, B.J., Leung, G.M., & Wu, P. (2020). Letter to the editor: COVID-19 cases among school-aged children and school-based measures in Hong Kong, July 2020. <i>Eurosurveillance</i> 25(37).</p>	<p>Sep 17, 2020</p>	<p>Schools, Hong Kong</p>	<p>Screening, temperature checks, and cohorting measures all implemented. Students required to physically distance by 1.5 meters. Students and staff required to wear masks. Enhanced cleaning and hand hygiene measures in place.¹⁸</p>	<p>Secondary schools returned late May and primary schools in early Jun. Schools closed again Jul 12 (summer break). By Jul 18 there were 20 cases in children aged 5-17 years.</p> <p>15 cases were linked to household or community clusters, or unknown source. 5 cases linked to a secondary school cluster and tutorial center cluster.</p> <p>School wide testing occurred for 7/15 cases, and the two school/tutorial center clusters. No other cases in this age range have been linked to the 20 cases.</p>	<p>Moderate</p>
<p>Lopez, A.S., Hill, M., Antezano, J., Vilven, D., Rutner, T., Bogdanow, L., ... Tran, C.H. (2020). Transmission dynamic of COVID-19 outbreaks associated with child care facilities – Salt Lake City, Utah, April-July 2020. <i>Morbidity and Mortality Weekly Report</i> 69(37): 1319–1323.</p>	<p>Sep 11, 2020</p>	<p>Child care facilities and day camps for school-aged children Utah, United States</p>	<p><u>Facility A:</u> temperature checks, frequent cleaning, staff masks</p> <p><u>Facility B:</u> temperature checks, frequent cleaning, staff masks</p> <p><u>Facility C:</u> home temperature and symptom screening requested, no masks</p>	<p>From Apr 1–Jul 10 Salt Lake County, Utah identified 17 child care facilities with at least two confirmed COVID-19 cases; this report describes 3.</p> <p>Amongst 101 staff and children, 22 confirmed cases identified (10 staff, 12 children). Amongst 83 close contacts, 9 confirmed (2 adult, 7 pediatric) and 7 probable (2 adult, 5 pediatric) cases were identified.</p> <p>Facility attack rates ranged from 17%-100%. Overall attack rates ranged from 7%-36%.</p> <p><u>Facility A:</u> 12 staff and children, 15 close contacts, 2 confirmed adult cases, no transmission to/from children; index case staff</p> <p><u>Facility B:</u> 5 staff and children in setting all tested positive, of 28 close contacts 2 confirmed and 3 probable cases; likely transmission from children to household; index case staff</p> <p><u>Facility C:</u> 84 staff and children, 15 confirmed cases ; 40 close contacts had 5 confirmed and 2 probable cases; likely transmission from children; index case unknown</p>	<p>High</p>

¹⁸ Centre for Health Protection & Department of Health. (2020, October 23). [Health Advice to Schools for the Prevention of Coronavirus disease \(COVID-19\)](#).

<p>Link-Gelles, R., DellaGrotta, A.L., Molina, C., Clyne, A., Campagna, K., Lanzieri, T.M., ... Bandy, U. (2020). Limited Secondary Transmission of SARS-CoV-2 in Child Care Programs -Rhode Island, June 1-July 31, 2020. <i>Morbidity and Mortality Weekly Report</i> 69(34): 1170-1172.</p>	<p>Aug 28, 2020</p>	<p>Child care Rhode Island, United States</p>	<p>Screening, reduced class sizes, and cohorting all implemented. Masks required for staff at all times and for children in common areas only. Enhanced cleaning and hand hygiene measures in place.¹⁹</p>	<p>Child care programs re-opened on Jun 1, 2020; data presented on all possible child care-associated COVID-19 cases to Jul 31, 2020.</p> <p>52 positive/probable cases of 101 possible cases reported:</p> <ul style="list-style-type: none"> • 30 (58%) children (median age = 5 years) • 22 (42%) adults (20 teachers, 2 parents) <p>Cases occurred in 29 (4.4%) of 666 re-opened child care programs:</p> <ul style="list-style-type: none"> • 20 programs (69%) had a single case with no secondary transmission • 5 programs (15%) had 2-5 cases with no secondary transmission • 4 programs (0.6%) had possible secondary transmission <p>Among 4 programs with possible secondary transmission:</p> <ul style="list-style-type: none"> • Program #1: 5 children, 4 staff, 1 parent; 60 children and 21 staff quarantined • Program #2: 3 confirmed cases; 26 students and 17 staff quarantined • Program #3: 2 cases; appear un-linked but cannot confirm • Program #4: 1 staff, 1 child; 37 students and 16 staff quarantined <p>In programs where secondary transmission likely took place, epidemiologic investigations identified lack of adherence to Department of Health guidelines (e.g., movement between groups/classrooms).</p>	<p>Moderate</p>
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¹⁹ Singapore Government Agency: Early Childhood Development Agency. (2020, May 28). [Letter to Parents: COVID-Safe ABCs – Back to School with Our New ABCs: Let’s Stay Safe Together](#).

<p>Blaisdell, L.L., Cohn, W., Pavell, J.R., Rubin, D.S. & Vergales, J.E. (2020). Preventing and Mitigating SARS-CoV-2 Transmission – Four Overnight Camps, Maine, June-August 2020. <i>Morbidity and Mortality Weekly Report</i> 69(35): 1216-1220.</p>	<p>Aug 26, 2020</p>	<p>Overnight camps Maine, United States</p>	<p>Preventative measures included prearrival quarantine, pre- and post-arrival testing and symptom screening, cohorting, face coverings, physical distancing, enhanced hygiene, cleaning and disinfecting and maximal outdoor programming.</p>	<p>642 children and 380 staff members (aged 7-70 years) attended 4 overnight camps from Jun-Aug 2020.</p> <p>12 attendees (11 children and 1 staff) were identified as having COVID-19 related signs or symptoms during daily screening checks. All tested negative.</p> <p>Three asymptomatic attendees tested positive for SARS-CoV-2 after camp arrival (1 child, 2 staff). They were immediately isolated, and respective cohorts quarantined. No secondary transmission was identified.</p>	<p>Moderate</p>
<p>Szablewski, C.M., Chang, K.T., Brown, M.M., Chu, V.T., Yousaf, A.R., Anyalechi, N., ... Stewart, R.J. (2020). SARS-CoV-2 transmission and infection among attendees of an overnight camp. <i>Morbidity and Mortality Weekly Report</i> 69(31): 1023-1025.</p>	<p>Jul 31, 2020</p>	<p>Overnight summer camp Georgia, USA</p>	<p>All attendees tested negative within 12 days of attending.</p> <p>Masks for staff but not campers, doors and windows were not opened for ventilation.</p>	<p>158 staff and counsellors took part in training Jun 17-20. 363 campers and 3 staff joined on Jun 21.</p> <p>On Jun 22 a staff member developed symptoms, on Jun 23 left the camp and on Jun 24 tested positive. The camp was closed that day.</p> <p>Test results were available for 344 of 597 attendees.</p> <p>Attack rate was highest amongst staff (56%) compared to youth (49%), and those in larger cabins (53%).</p> <p>The authors note they cannot rule out multiple index cases due to high incidence of COVID-19 in Georgia.</p>	<p>Low</p>
<p>Stein-Zamir, C., Abramson, N., Shoob, H., Libal, E., Bitan, M., Cardash, T., ... Miskin, I. (2020). A large COVID-19 outbreak in a high school 10 days after schools' reopening, Israel, May 2020. <i>Eurosurveillance</i> 25(29): pii=2001352.</p>	<p>Jul 23, 2020</p>	<p>Regional public school with 1,190 students age 12-18 years and 162 staff. Israel</p>	<p>No physical distancing or masks. Children took school buses together and participated in extra-curricular activities (e.g., sports and dance classes).</p>	<p>Within 10 days of schools reopening an outbreak among secondary school students was observed linked back to 2 independent index cases. The prevalence of confirmed cases was 13.1% among students and 16.4% among teachers.</p> <p>Cases were highest in grade 7 and grade 9. There was no report of the grade of index cases, or prevalence among close contacts.</p> <p>Prior to school reopening regional prevalence rate among those age 10-19 years was 19.8%. Following opening of schools, the prevalence increased to 40.9%.</p>	<p>Low</p>

<p>Yung, C.H., Kam, K., Nadua, K.D., Chong, C.Y., Tan, N.W.H., Li, J., ... Ng, K.C. (2020). Novel coronavirus 2019 transmission risk in educational settings. <i>Clinical Infectious Diseases</i>. Epub ahead of print.</p>	<p>Jun 25, 2020</p>	<p>Preschool, secondary school Singapore</p>	<p>In secondary schools, visual screening and temperature checks are done twice daily. Cohorting of classes is implemented. Physical distancing for students and staff implemented, including fixed seating and staggered travel for students. Masks mandatory for students and staff. Enhanced cleaning and hand hygiene measures in place. Students and staff must stay home if unwell or if household members are unwell or on "home quarantine order."</p>	<p>1 child with COVID-19 attended a preschool for ages 3–6 (number of contacts not reported):</p> <ul style="list-style-type: none"> • 34 contacts developed symptoms and were tested; none tested positive <p>1 adolescent with COVID-19 attended a secondary school for ages 12–15 (total number of contacts not reported):</p> <p>8 contacts developed symptoms and were tested; none tested positive</p>	<p>High</p>
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Table 3: Data collected prior to school lockdown measure; no infection prevention or control measures in place

Reference	Date Released	Study Design	Location	Setting	Summary of Findings	Quality Rating:
New evidence reported January 21, 2021						
Yoon, Y., Choi, G.J., Kim, J.Y., Kim, K.R., Park, H., Chun, J.K., & Kim, Y.J. (2020). Childcare Exposure to Severe Acute Respiratory Syndrome Coronavirus 2 for 4-Year-Old Presymptomatic Child, South Korea. <i>Emerging Infectious Diseases</i> . Epub ahead of print.	Nov 30, 2020	Prevalence	South Korea	Child care	Among 190 child care centre attendees and staff identified as contacts of a case of confirmed COVID-19 infection in a child attending the centre, all contacts were tested, and none developed infection.	Moderate
Previously reported evidence						
Desmet, S., Skinci, E., Wouters, I., Decru, B., Beuselinck, K., Malhotra-Kumar, S., & Theeten, H. (2020). No SARS-CoV-2 carriage observed in children attending daycare centers during the first weeks of the epidemic in Belgium. <i>Journal of Medical Virology</i> . Epub ahead of print.	Nov 24, 2020	Prevalence	Belgium	Daycare centers	84 children aged 0–2.5 years attending 8 different daycare centers were randomly sampled and tested for COVID-19 in Feb (at the start of the epidemic) and in Mar (before lockdown). No children tested positive.	High

<p>Dub, T., Erra, E., Hagberg, L., Sarvikivi, E., Virta, C., Jarvinen, A., ... Nohynek, H. (2020). Transmission of SARS-CoV-2 following exposure in school settings: experience from two Helsinki area exposure incidents. <i>Preprint.</i></p>	<p>Jul 30, 2020</p>	<p>Case report</p>	<p>Finland</p>	<p>Primary school, other school not noted.</p>	<p>Case A (age 12) tested positive for COVID-19 in early Mar after attending school and team sports with minor symptoms since late Feb. 89 of 121 close school and sport contacts tested; no secondary cases identified.</p> <p>Case B (school staff) attended work for 2 days while symptomatic. 51 of 63 close contacts tested for antibodies >28 days post-exposure. 6 of 42 students, 1 of 9 teachers were positive for IgG antibodies. 2 students had confirmed case 7- and 6-days post-exposure, 1 student had confirmed COVID-19 >26 days post-exposure, thus source was unconfirmed.</p> <p>Secondary attack rate for household and extended contacts for students was 17%.</p> <p>Secondary attack rate for staff was 100% (spouse and two children contacts).</p>	<p>High; <i>PREPRINT</i></p>
<p>Torres, J.P., Piñera, C., De La Maza, V., Lagomarcino, A.J., Simian, D., Torres, B., ... O’Ryan, M. (2020). SARS-CoV-2 antibody prevalence in blood in a large school community subject to a Covid-19 outbreak: a cross-sectional study. <i>Clinical Infectious Diseases.</i> Epub ahead of print.</p>	<p>Jul 10, 2020</p>	<p>Prevalence</p>	<p>Chile</p>	<p>Private school with 14 grade levels</p>	<p>There were 52 confirmed cases in students (15%), staff (35%) and parents (52%) following a week of parent-teacher nights. Index case was a staff member.</p> <p>Positive antibody tests were higher amongst teachers (20.6%) compared to support staff (7.1%) and students (9.9%) two months later.</p> <p>1,009 of 2,616 students (aged 4–18) participated:</p> <ul style="list-style-type: none"> • 100 students (9.9%; CI=8.6, 11.5) tested positive for antibodies • The highest positive rate was among preschool students (12.3%; CI=7.8, 18.6) and lowest was among secondary school students (5.7%; CI=3.6, 8.9) <p>Students were more likely to have contracted COVID-19 from home caregivers and household relatives than classmates or teachers.</p>	<p>Moderate</p>

Brown, N.E., Bryant-Genevier, J., Bandy, U., Browning, C.A., Berns, A.L., ... Watson, J. (2020). Antibody Responses after Classroom Exposure to Teacher with Coronavirus Disease, March 2020 . <i>Emerging Infectious Diseases</i> 26(9).	Jun 29, 2020	Cross-sectional	United States	Secondary school	<p>A symptomatic teacher, who had taught 16 different classes during Feb 24-27, tested positive for COVID-19 on Mar 1.</p> <p>Among 21 students who had contact with the teacher, and who volunteered to participate in a serologic survey, results for only two students suggested previous SARS-CoV-2 infection (both positive and indeterminate results).</p>	Low
Fontanet, A., Grant, R., Tondeur, L., Madec, Y., Grzelak, L., Cailleau, I., ... Hoen, B. (2020a). SARS-CoV-2 infection in primary schools in northern France: A retrospective cohort study in an area of high transmission . <i>Preprint</i> .	Jun 29, 2020	Retrospective cohort	France	<p>Primary school</p> <p>Schools had been shut down for 4 weeks prior to antibody testing.</p>	<p>510 of 1047 students (aged 6–11 years) at a primary school consented to testing for antibodies to the virus that causes COVID-19:</p> <ul style="list-style-type: none"> • 45 of 510 (8.8%) tested positive for antibodies • 11.9% parents tested positive for antibodies <p>No information was reported on index cases.</p>	Moderate; PREPRINT
Heavey, L., Casey, G., Kelly, C., Kelly, D., & McDarby, G. (2020). No evidence of secondary transmission of COVID-19 from children attending school in Ireland, 2020 . <i>Eurosurveillance</i> 25(21):pii=2000903.	May 28, 2020	Case report	Ireland	<p>Primary school, secondary school</p>	<p>3 children aged 10–15 with COVID-19 attended one primary and two secondary schools:</p> <ul style="list-style-type: none"> • The children had contact with 822 students and 83 adults in schools • Contacts who developed symptoms were tested; the number was not reported <p>No contacts tested positive.</p>	Moderate

Fontanet, A., Tondeur, L., Madec, Y., Grant, R., Besombes, C., Jolly, N., ... Hoen, B. (2020b). Cluster of COVID-19 in northern France: A retrospective closed cohort study. <i>Preprint.</i>	Apr 23, 2020	Prevalence	France	Secondary school Schools had been shut down for 4 weeks prior to antibody testing.	326 of 1262 students (aged 14–17), teachers and staff at a secondary school consented to testing for antibodies to the virus that causes COVID-19: <ul style="list-style-type: none"> • 92 of 240 (38.3%) of students tested positive for antibodies • 11.4% of parents tested positive for antibodies • 10.2% of siblings tested positive for antibodies 	Moderate; <i>PREPRINT</i>
Danis, K., Epaulard, O., Bénet, T., Gaymard, A., Campoy, S., Bothelo-Nevers, E., ... Saura, C. (2020). Cluster of Coronavirus Disease 2019 (COVID-19) in the French Alps, February 2020. <i>Clinical Infectious Diseases 71(15): 825-832.</i>	Apr 11, 2020	Case report	France	Primary schools Schools were closed upon identification of the case.	1 child aged 9 years with COVID-19 attended 3 primary schools: <ul style="list-style-type: none"> • The child had 86 contacts • 55 contacts developed symptoms and were tested; none tested positive 	High

Table 4: In-progress Single Studies

Title	Anticipated Release Date	Setting	Description of Document
Previously reported evidence			
Duysburgh, E. & Vermeulen, M. (2020). <i>Prevalence and Incidence of Antibodies Against SARS-CoV-2 in Children Measured for One Year in Belgium: a Sero-epidemiological Prospective Cohort Study.</i>	Aug 31, 2021	Schools	This study will determine the seroprevalence and seroconversion of antibodies against SARS-CoV-2 in primary and secondary school-aged children at different time points.
Assistance Publique - Hôpitaux de Paris. (2020). <i>COVID-19 Infection and Transmission in Exposed, Confined and Community-based Infants (COVIDOCRECHE).</i>	Estimated study completion date: Jun 2, 2021	Hospitals, Child care centres for healthcare workers' children	This study will measure rates of COVID-19 cases and presence of anti-SARS-CoV2 antibodies in children of healthcare workers attending child care, child care staff, and hospital laboratory and administrative workers.
German Clinical Trials Register. (2020). <i>Prospective Study initiated by University Hospital Rostock concerning COVID-19 in mothers, nursery and school teachers of children in Rostock.</i>	N/A	Child care, schools	This study will measure prevalence of COVID-19 and associated antibodies in mothers, child care nurses and teachers, and school teachers over the period of 12 months.
Charité. (2020). <i>Berlin's testing strategy – Charité starts screening program for staff from childcare centers and school-based study.</i>	N/A	School	Through this study, primary and secondary school children and staff will undergo testing at regular intervals over 12 months.

Table 5: Syntheses

Reference	Date Released	Included Studies Relevant to Transmission by Children in Daycares and Schools	Review Conclusions	Quality Rating
New evidence reported January 21, 2021				
<p>Walsh, S., Chowdhury, A., Russell, S., Braithwaite, V., Ward, J., Waddington, ... Mytton, O. (2021). Do school closures reduce community transmission of COVID-19? A systematic review or observational studies. <i>Preprint</i>.</p>	<p>Jan 4, 2021 (Search completed Oct 12, 2020)</p>	<p>Stein-Zamir, 2020 Auger, 2020 Courtemanche, 2020 Yehya, 2020 Juni, 2020 Wong, 2020</p>	<p>This review included 10 studies that explored the effect of school closures on community transmission of COVID-19. One study explored the impact of school reopening. Most studies had serious to critical risk of bias.</p> <p>The studies with the lowest risk of bias found no conclusive evidence that school closures alone resulted in reduced transmission. Studies with high to critical risk of bias found protective effect of up to 62% relative reduction in incidence and mortality rate.</p> <p>Variability in the findings may reflect the methodology used and the importance of contextual factors (not studied) across geographic regions.</p> <p>The inability to properly adjust for other interventions, mostly introduced at the same time as school closures, may result in overestimation of the effects of school closures. Other limitations include an inability to distinguish between school type (primary, secondary) and direct vs. indirect (e.g., parents staying home, too) effects of school closures.</p>	<p>Moderate; <i>PREPRINT</i></p>

<p>Krishnaratne, S., Pfadenhauer, L.M., Coenen, M., Geffert, K., Jung-Sievers, C., Klinger, C., ... Burns, J. (2020). Measures implemented in the school setting to contain the COVID-19 pandemic: a rapid scoping review. <i>Cochrane Database Systematic Reviews</i>, 12.</p>	<p>Dec 17, 2020 (Search completed Oct 8, 2020)</p>	<p>Buonsenso, 2020 Curtius, 2020 Ehrhardt, 2020 Isphording, 2020 Macartney, 2020 NCIRS, 2020 Otte Im Kampe, 2020 Simonsen, 2020 Sparks, 2020 Stein-Zamir, 2020 Yoon, 2020</p>	<p>This rapid scoping review identified studies that reports on implementation of measures in schools but did not report on the effectiveness of these. The majority of included studies (n=31) were inferential modelling studies. 11 observational/quasi-experimental studies were included that are included in this rapid review.</p> <p>Identified school-based measures included:</p> <ul style="list-style-type: none"> • Organizational (n=36; e.g., to make contacts safer (mask use, hand hygiene, respiratory etiquette, physical distancing, modified activities) and reduce opportunity for contacts (staggered arrivals, breaks, rotating attendance, cohorts, stay-at-home policies) • Structural/environmental (n=11; e.g., school yard division, furniture removal and distancing, improved ventilation and cleaning protocols) • Surveillance/response (n=19; e.g., testing, tracing, screening, quarantining) 	<p>Moderate</p>
<p>Li, X., Xu, W., Dozier, M., He, Y., Kirolos, A., Lang, Z., ... Theodoratou, E. (2020). The role of children in the transmission of SARS-CoV2: updated rapid review. <i>The Journal of Global Health</i>, 10(2): 021101.</p>	<p>Sep 23, 2020 (Search completed Jun 21, 2020)</p>	<p>Desmet, 2020 Heavey, 2020 Yung, 2020 Clalit Health Services, 2020 Danis, 2020 Fontanet, 2020a NCIRS, 2020 RIVM, 2020</p>	<p>There is limited evidence available for quantifying the extent to which children may contribute to overall transmission, but the balance of evidence so far suggests that children and schools play only a limited role in overall transmission.</p>	

Previously reported evidence				
Suk, J.E., Vardavas, C., Nikitara, K., Phalkey, R., Leonardi-Bee, J., Pharris, A., ... Semenza, J.C. (2020). The role of children in the transmission chain of SARS-CoV-2: a systematic review and update of current evidence. <i>Preprint.</i>	Nov 9, 2020 (Search completed Aug 31, 2020)	Heavey, 2020 Danis, 2020 Yung, 2020 Macartney, 2020 Stein-Zamir, 2020 Link-Gelles, 2020 Koo, 2020 Zhang, 2020 Bayham, 2020 Kim, 2020 Chin, 2020 Abdollahi, 2020 Prem, 2020 Auger, 2020	There was limited to no evidence of secondary transmission among school contacts. One outbreak following school re-opening was attributed to crowded classes, no masks, and the use of air conditioning. Conversely, another study showing limited transmission after re-opening attributed success to class distancing, use of masks for adults, daily screening, and disinfection.	Moderate; PREPRINT
Goldstein, E., Lipsitch, M., & Cevik, M. (2020). On the effect of age on the transmission of SARS-CoV-2 in households, schools and the community. <i>The Journal of Infectious Diseases.</i> Epub ahead of print.	Oct 29, 2020 (Search completed Oct 5, 2020)	Ehrhardt, 2020 Fontantet, 2020a Fontantet, 2020b Macartney, 2020 Stein-Zamir, 2020 Torres, 2020 Otte im Kampe 2020 Salt Lake County, 2020.	Some evidence that no/limited mitigation strategies (e.g., crowded classrooms) are associated with spread of SARS-CoV-2 in secondary schools. However, introduction of mitigation strategies may prevent outbreaks.	Low
Xu, W., Li, X., Dozier, M., He, Y., Kirolos, A., Lang, Z., ... Theodoratou, E. (2020). What is the evidence for transmission of COVID-19 by children in schools? A living systematic review. <i>Preprint.</i>	Oct 14, 2020 (Search completed Sep 14, 2020)	Danis, 2020 Heavey, 2020 Yung, 2020 NCIRS, 2020 Macartney, 2020 Torres, 2020 Armann, 2020 Desmet, 2020 Fontanet, 2020a Fontanet, 2020b Stein-Zamir, 2020	Five cohort studies found 18 secondary cases in 3345 contacts. Six cross-sectional studies reported 639 COVID-19 cases from 6682 participants tested. The authors calculated the pooled attack rate to be 0.08% (95% CI=0.00, 0.86). Quality of evidence (based on 5 cohort studies and 6 cross-sectional studies) was low but suggests that students have lower infection attack rates and positivity rates, compared to staff.	Moderate; PREPRINT

Health Information and Quality Authority. (2020, Aug 21). Evidence summary for potential for children to contribute to transmission of SARS-CoV-2.	Aug 21, 2020 (Search completed Aug 10, 2020)	Desmet, 2020 Dub, 2020 Fontanet, 2020a Heavey, 2020 Macartney, 2020 Stein-Zamir, 2020	Based on low certainty evidence, transmission from child-to-adult or child-to child does occur in household and education settings, but transmission rates for children are low. Three studies with nine cases and 1036 close contacts confirmed secondary transmission. Three studies with 74 confirmed cases across 66 facilities to over 13 000 close contacts identified 198 confirmed cases.	Low; NOT PEER REVIEWED
Alberta Health Services. (2020, Aug 7). COVID-19 Scientific Advisory Group Rapid Evidence Report.	Aug 7, 2020 (Search completed Jun 10, 2020)	Number of studies not reported, included scientific evidence and news media reports	Exposed children in schools and daycares appear to be less infected than exposed adults in other settings. There is no evidence to suggest that transmission to teachers and staff is higher than community-based transmission. Transmission appears to be lower for younger children and may be higher for older children and teens in school settings; transmission can be limited if public health precautions are in place.	Moderate; NOT PEER REVIEWED
Public Health England. (2020, Jul 28). Transmission of COVID-19 in school settings and interventions to reduce the transmission: a rapid review.	Jul 28, 2020 (Search completed Jun 18, 2020)	Danis, 2020 Fontanet, 2020a NCIRS, 2020	Transmission of COVID-19 within school settings is low, however additional research is needed to understand the role of schools in transmission of COVID-19.	Moderate; NOT PEER REVIEWED
Rajmil, L. (2020). Role of children in the transmission of the COVID-19 pandemic: a rapid scoping review. <i>BMJ Paediatrics Open</i> , 4(1), e000722.	Jun 30, 2020 (Search completed May 28, 2020)	Heavey, 2020 NCIRS, 2020 RIVM, 2020	Children do not transmit the virus that causes COVID-19 more than adults. Many reported cases of transmission in children were traced to transmission within families.	Low
Institut national de sante publique Québec. (2020, May 21). Revue rapide de la littérature scientifique - COVID-19 chez les enfants: facteurs de risque d'infections sévères et potentiel de transmission.	May 21, 2020 (Search completed May 15, 2020)	Danis, 2020 Fontanet, 2020a NCIRS, 2020	Children are susceptible to COVID-19 infection, but upon exposure to the COVID-19, they are less likely to be infected than adults. Transmission of COVID-19 by children is limited.	Low; NOT PEER REVIEWED

Ludvigsson, J.F. (2020). Children are unlikely to be the main drivers of the COVID-19 pandemic – A systematic review . <i>Acta Paediatrica</i> 109(8), 1525-1530.	May 19, 2020 (Search completed May 11, 2020)	Danis, 2020 NCIRS, 2020	Children are unlikely to be key drivers of transmission. Opening daycares and schools is unlikely to affect mortality in adults.	Low
Brurberg, K.G. (2020). The role of children in the transmission of SARS-CoV-2-19 – 1st update - a rapid review Oslo: Folkehelseinstituttet/ Norwegian Institute of Public Health.	Apr 30, 2020 (Search completed Apr 22, 2020)	Fontanet, 2020a NCIRS, 2020 Viner, 2020a	Children can transmit the virus that causes COVID-19 but are unlikely to be the main drivers of transmission. It is too early to make firm conclusions about the role of children in transmission.	Low
Viner, R.M., Russell, S.J., Croker, H., Packer, J., Ward, J., Stansfield, C., ... Booy, R. (2020a). School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review . <i>The Lancet Child & Adolescent Health</i> , 4(5), 397–404.	Apr 6, 2020 (Search completed Mar 19, 2020)	None included in Table 1. This review included studies from pandemics prior to COVID-19.	It is not possible to specifically evaluate the impact of school closures on infection prevention and control, as they were part of a broad range of quarantine and social distancing measures.	Low

Table 6: In-progress Syntheses

Title	Anticipated Release Date	Setting	Description of Document
Previously reported evidence			
Minozzi, S., Amato, L., Mitrova, Z., & Davoli, M. (2020). <i>COVID-19 among children and adolescents and impact of school closure on outbreaks control: an overview of systematic reviews</i> . PROSPERO, CRD42020186291.	Unknown; completed but not published	Home, school	This review will summarize available evidence for the prevalence of infection and disease as well as the risk of transmission by children and adolescents. The review also seeks to assess the effect of school closures on controlling the spread of COVID-19.
Chatterji, M., Kitamura, K., Muenig, P., Willson, G.E., De Leon Jr., R., & Allegrante, J.P. (2020). <i>The relative effectiveness of multilevel interventions in reducing risks of transmission of lethal viruses in Grade K-12 school communities and school linked populations: a systematic review and best-evidence synthesis</i> . PROSPERO, CRD42020201930.	Aug 29, 2020	School and school-linked populations	This review will report on the relative efficacy of multilevel intervention in reducing risks of COVID-19 and other lethal viruses among kindergarten to grade 12 school communities and in school linked populations.
Bhamani, S., Tabani, A., Ahmed, D., & Saleem, A. (2020). <i>A rapid systematic review on COVID transmission trends in children on schools reopening in lower middle income countries</i> . PROSPERO, CRD42020204925.	Feb 28, 2021	Schools	This review will summarize virus transmission among children and outbreaks occurring after schools re-open in lower middle-income countries.

References

- Alberta Health Services. (2020, Aug 7). [COVID-19 Scientific Advisory Group Rapid Evidence Report.](#)
- Armann, J.P., Unrath, M., Kirsten, C., Lück, C., Dalpke, A.H., & Berner, R. (2020). [SARS-CoV-2 IgG antibodies in adolescent students and their teachers in Saxony, Germany \(SchoolCoviDD19\): persistent low seroprevalence and transmission rates between May and October 2020.](#) *Preprint.*
- Assistance Publique - Hôpitaux de Paris. (2020). [COVID-19 Infection and Transmission in Exposed, Confined and Community-based Infants \(COVIDOCRECHE\).](#)
- Bhamani, S., Tabani, A., Ahmed, D., & Saleem, A. (2020). [A rapid systematic review on COVID transmission trends in children on schools reopening in lower middle income countries.](#) *PROSPERO, CRD42020204925.*
- Bignami-van Assche, S., Boujija, Y., Drouin, O., & Sandberg, J. (2020, Jan 12). [Enfants, écoles et COVID-19 : le cas montréalais.](#)
- Blaisdell, L.L., Cohn, W., Pavell, J.R., Rubin, D.S. & Vergales, J.E. (2020). [Preventing and Mitigating SARS-CoV-2 Transmission – Four Overnight Camps, Maine, June-August 2020.](#) *Morbidity and Mortality Weekly Report 69(35): 1216-1220.*
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